SD11
A5A3
Supplement to
1958 Annual Rpt.

Horton
Ft Collins

A GUIDE TO

FIELD LABORATORIES

OF THE

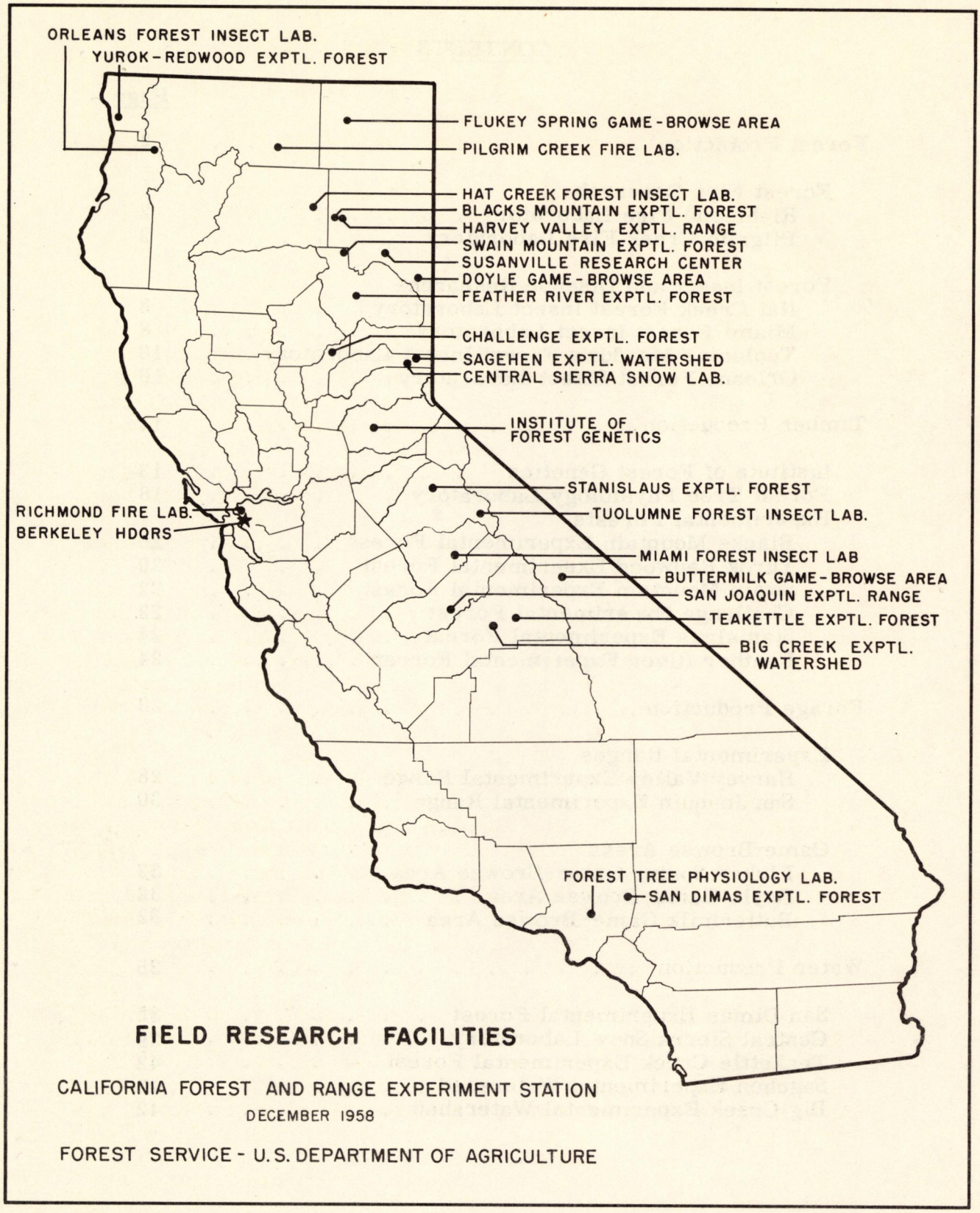
CALIFORNIA FOREST AND RANGE EXPERIMENT STATION

FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

CONTENTS

	Page
Forest Protection	2
Forest Fire Research	
Richmond Fire Laboratory	2
Pilgrim Creek Fire Laboratory	2
Forest Insect and Disease Research	
Hat Creek Forest Insect Laboratory	8
Miami Forest Insect Laboratory	8
Tuolumne Meadows Forest Insect Laboratory	10
Orleans Forest Insect Laboratory	10
Timber Production	14
Institute of Forest Genetics	13
Forest Tree Physiology Laboratory	18
Experimental Forests	
Blacks Mountain Experimental Forest	20
Yurok Redwood Experimental Forest	20
Swain Mountain Experimental Forest	22
Challenge Experimental Forest	22
Stanislaus Experimental Forest	24
Feather River Experimental Forest	24
Forage Production	28
Experimental Ranges	
Harvey Valley Experimental Range	28
San Joaquin Experimental Range	30
Game-Browse Areas	
Flukey Spring Game-Browse Area	32
Doyle Game-Browse Area	32
Buttermilk Game-Browse Area	32
Water Production	35
San Dimas Experimental Forest	35
Central Sierra Snow Laboratory	39
Teakettle Creek Experimental Forest	42
Sagehen Experimental Watershed	42
Big Creek Experimental Watershed	42

Prepared as a Supplement to the 1958 Annual Report
California Forest and Range Experiment Station



FIELD RESEARCH FACILITIES

CALIFORNIA FOREST AND RANGE EXPERIMENT STATION

DECEMBER 1958

FOREST SERVICE - U.S. DEPARTMENT OF AGRICULTURE

A GUIDE TO FIELD LABORATORIES

OF THE

CALIFORNIA FOREST AND RANGE EXPERIMENT STATION

People like to see for themselves. At least, more and more of them are asking where the Forest Service is making field studies. Educators and extension workers want to show students and land owners what's new. Land managers want the additional insight that comes from seeing research results on the ground. Researchers want to compare notes with others trying to solve similar problems, and they want to find areas where they can tie their own studies in with established research facilities. To help meet these needs, this booklet lists the Experiment Station's main field research facilities in the California region and outlines the kind of work we are doing there.

The booklet also pictures several Station activities not conducted at these field laboratories. For example, studies at temporary experimental areas, surveys of forest resources and pest conditions, and basic research at the Berkeley headquarters. These activities are a vital source of information needed to advance research at the Station's major field laboratories.

The field laboratories were developed over a period of 30 years by men of vision who set aside typical wild land areas where they could seek new knowledge and test its application. As funds permitted, they installed instruments, research equipment, and service buildings, and started experimental work. Some areas still lack certain installations, but today these facilities provide the framework for many elements of the research needed to insure continuous production from the wild land resources of the region.

Cooperating agencies have both helped in and benefitted from this development. More than half the field laboratories and much of the headquarters work include studies that are supported by funds or technical aid from cooperators. And the Forest Service facilities are available to cooperating agencies—many are enriching their own programs by using the facilities at these field laboratories. The cooperators include other Federal agencies, State agencies, educational institutions, industrial organizations, and endowed foundations.

RICHMOND FIRE LABORATORY

Location: Contra Costa County, Richmond, on the grounds of the Engineering Field Station, University of California.

Facilities: Laboratory space, a building 40 feet square with a 35-foot ceiling has been provided by the Engineering Department, University of California. This building, large enough to accommodate experimental fires, is equipped with instruments and apparatus for studying chemical fire suppressants, time required for ignition of forest fuels, convection columns of fires, rates of combustion of fuel beds, and moisture content of fuels.

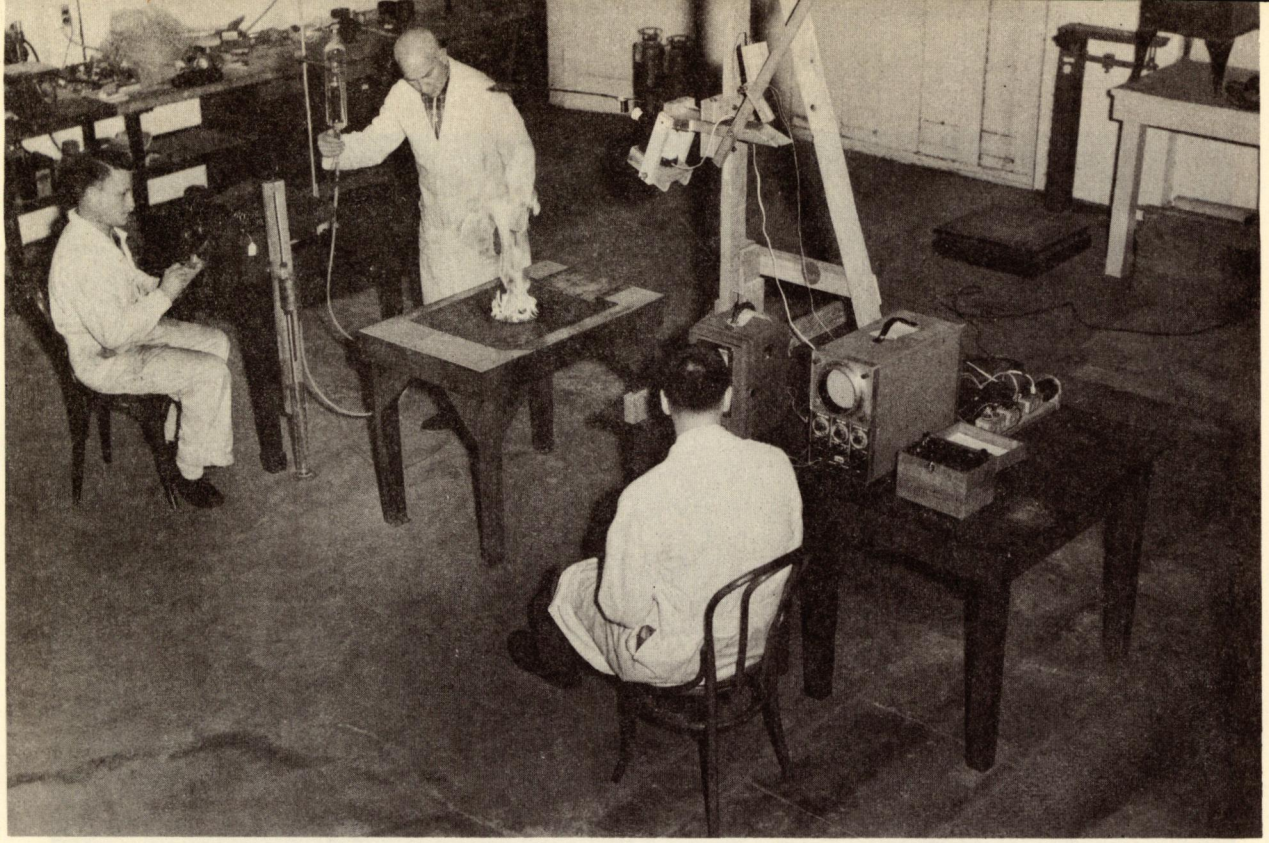
Research Program: Basic studies of fire physics are seeking a better understanding of the many variables that affect forest fire behavior. The present program is planned to help design a model combustion system that will represent the complex conditions in forest fires. Studies underway include:

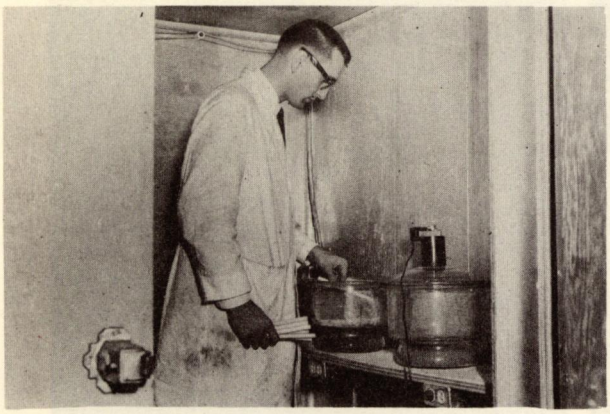
a. The effect of diameter of burning area on rate of combustion of liquid and solid fuels.
b. Efficiency of commercial chemical fire retardants.
c. Characteristics of convection columns, such as temperature and velocity with height, produced by fires varying in combustion rate and geometry of burning area.

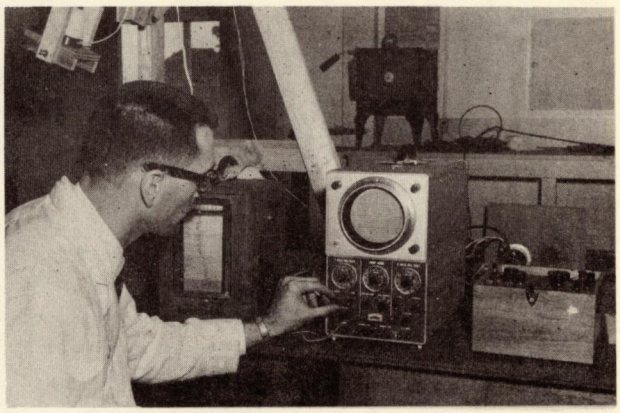
PILGRIM CREEK FIRE LABORATORY

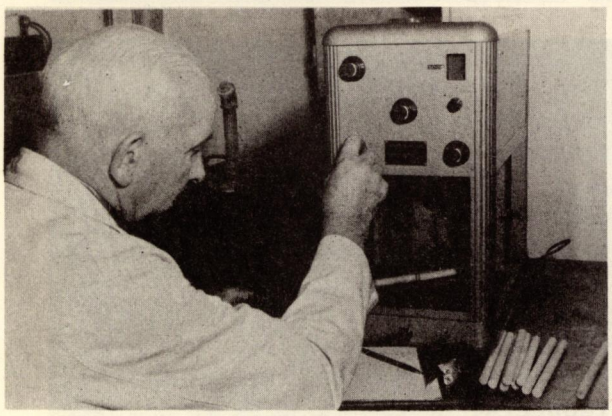
Location: Siskiyou County, about 20 miles east of the town of Mt. Shasta by way of State Highway 89 and unimproved forest road.

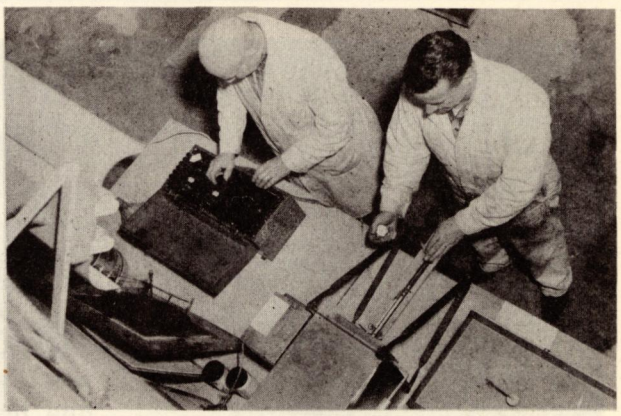
Type and Area: Practically all types of forest vegetation are represented in the study area for which Pilgrim Creek is field headquarters. Though not withdrawn from other use, the area includes about a half million acres of the Shasta-Trinity National Forest which can be used for forest fire research. Inactive since 1956.



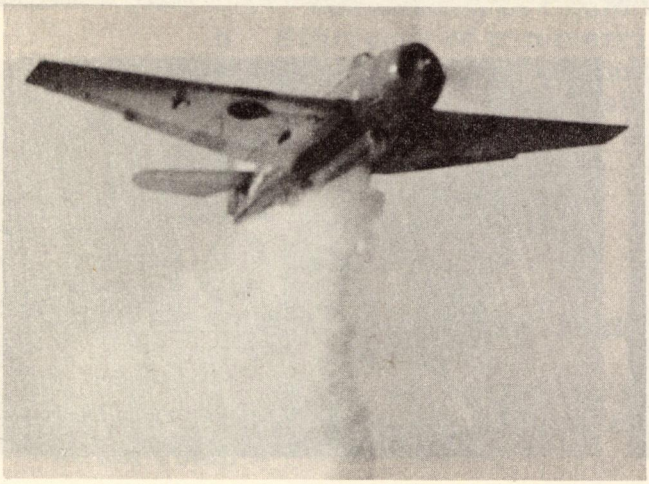


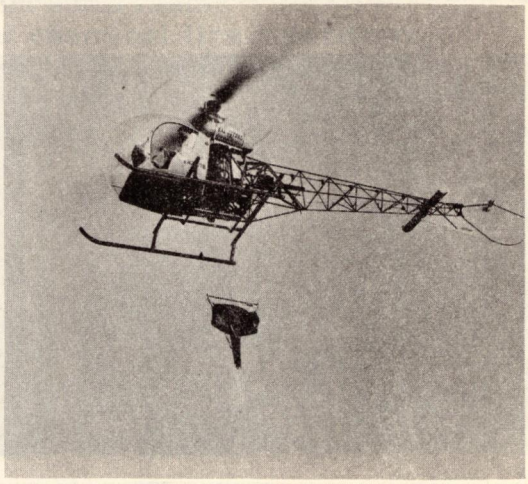






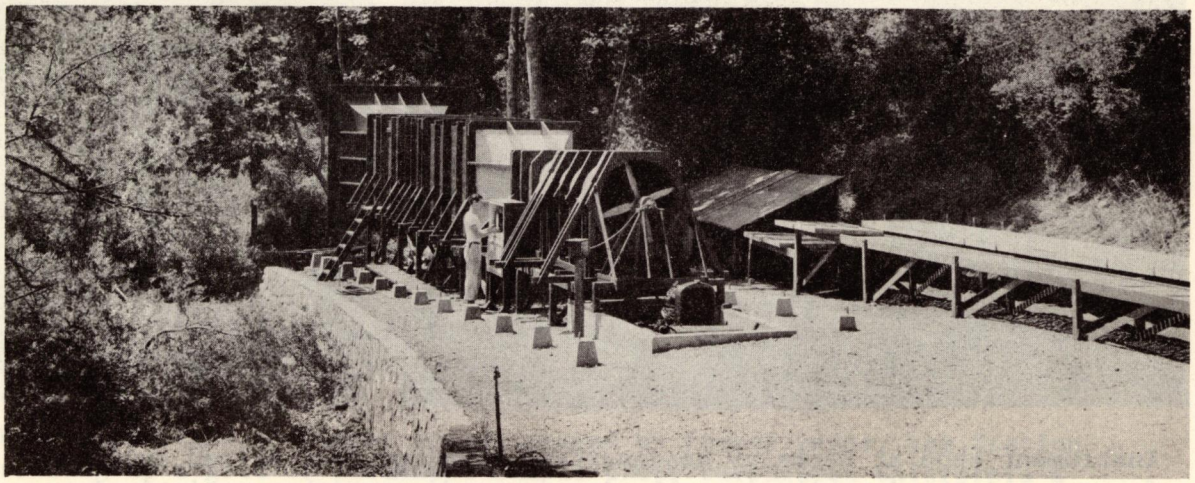
Basic research in the physics and chemistry of combustion processes is conducted at Richmond Fire Laboratory, maintained in cooperation with University of California. These fundamental studies aim to develop model fires that can provide new clues to forest fire behavior.

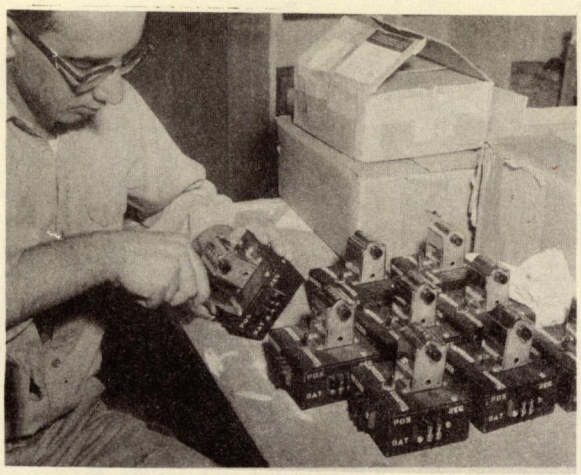


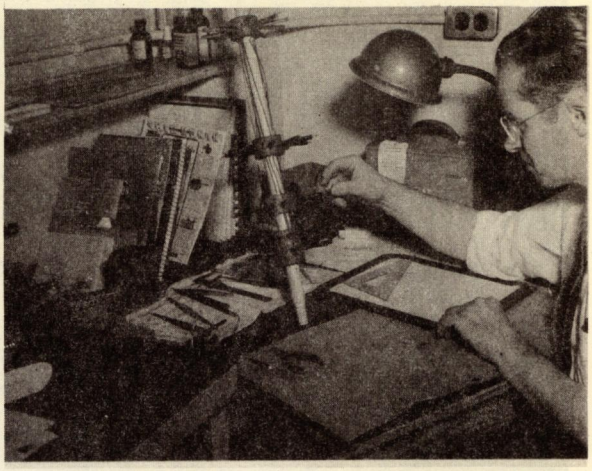


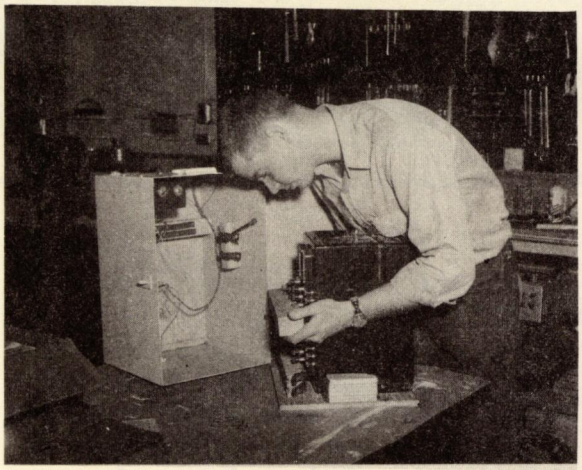
Field tests at temporary experimental areas feature both basic and applied studies--as in crib-fire studies that record heat energy and other environmental factors or in trials of such new fire-fighting tools as air tankers and helicopters.

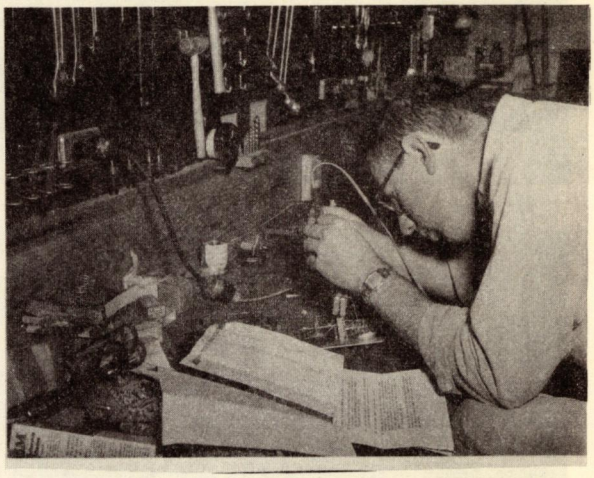
Southern California, with some of the Nation's toughest fire problems, is field headquarters for the new cooperative FUEL-BREAK project. Studies seeking more effective ways to prevent man-caused fires and operations research work are also headquartered here. Basic fire behavior studies can be carried out in wind tunnel at San Dimas Experimental Forest.

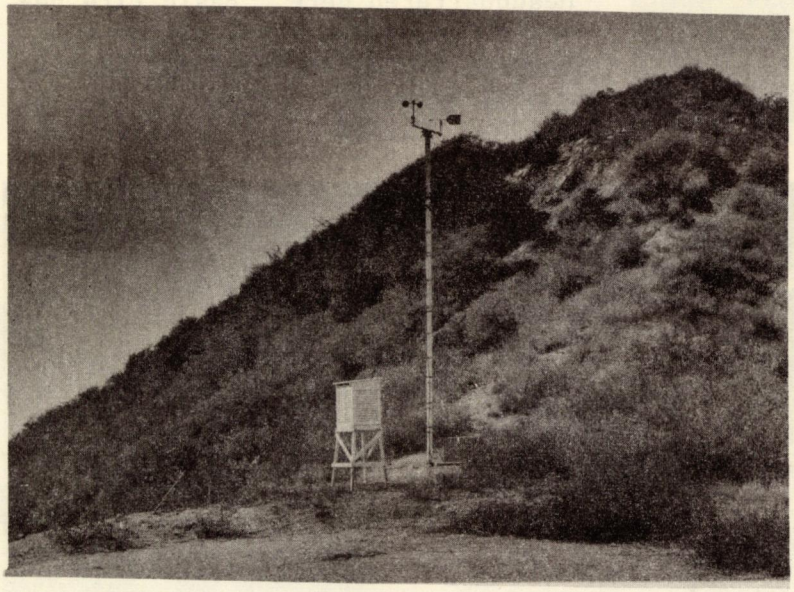


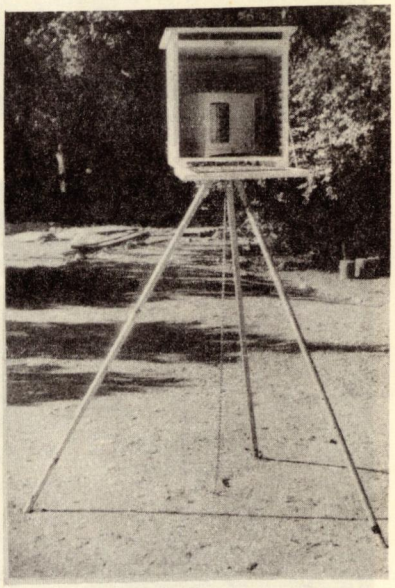




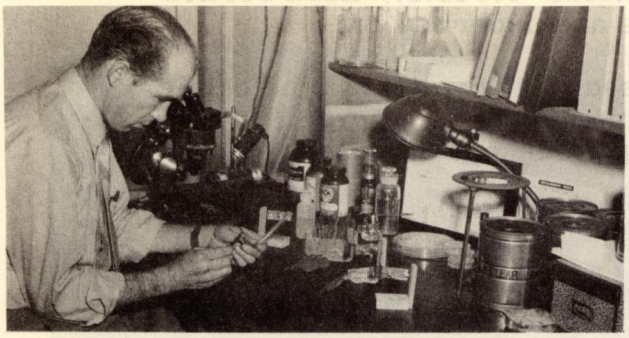


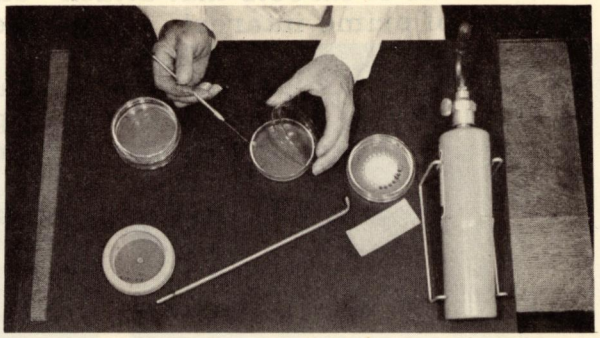






Instrument shop at Berkeley headquarters develops specialized equipment for permanent and mobile installations recording weather variations. Both fire and watershed research find this development program aids in compiling and analyzing great masses of data.





To help keep track of timber losses caused by forest pests, the Station is setting up a grid of permanent sample plots throughout California's commercial forest areas. Tree diseases like blister rust and wood-decaying fungi are studied in Berkeley laboratories in cooperation with the University of California. Disease control methods developed by Station are tested in permanent and temporary study areas.

HAT CREEK
FOREST INSECT LABORATORY

Location: Shasta County, about 25 miles north of Manzanita Lake, Lassen National Park, by way of State Highway 89.

Type and Area: Situated in a timber stand on the Lassen National Forest, this is a seasonal center for studies of forest insect problems on the dry northeastern plateau of California. Facilities include: insectary, laboratory, and darkroom.

Research Program: Biology, ecology, behavior, and control of insects that attack "eastside" forests. Bark beetles are of prime interest, and studies are underway on:

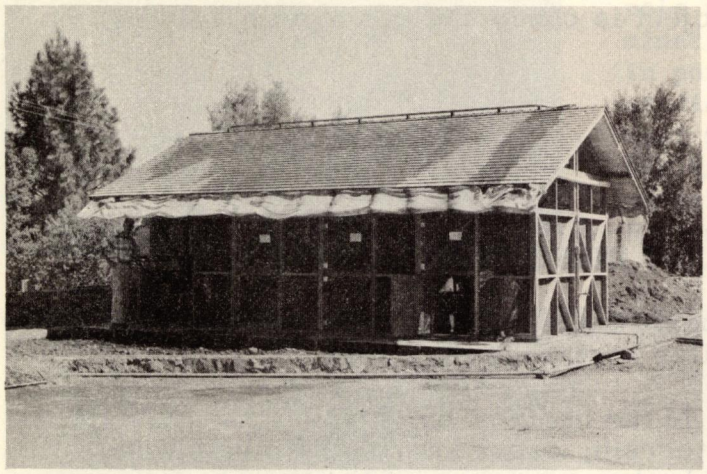
a. Tree mortality caused by the western pine beetle and the Jeffrey pine beetle.
b. How salvage logging influences bark beetle populations.
c. Ways to improve surveys of beetle-caused damage.

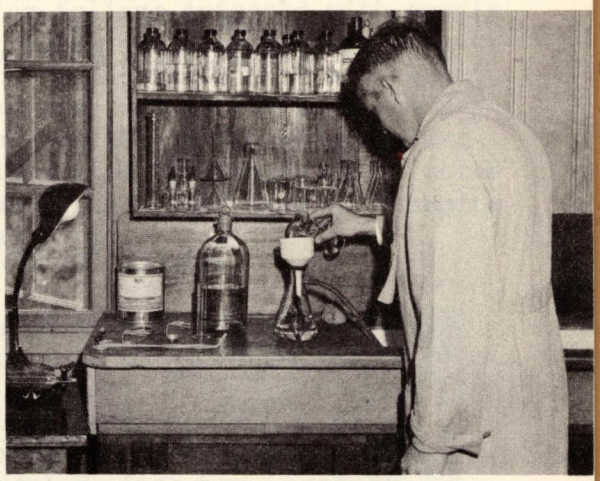
MIAMI FOREST INSECT LABORATORY

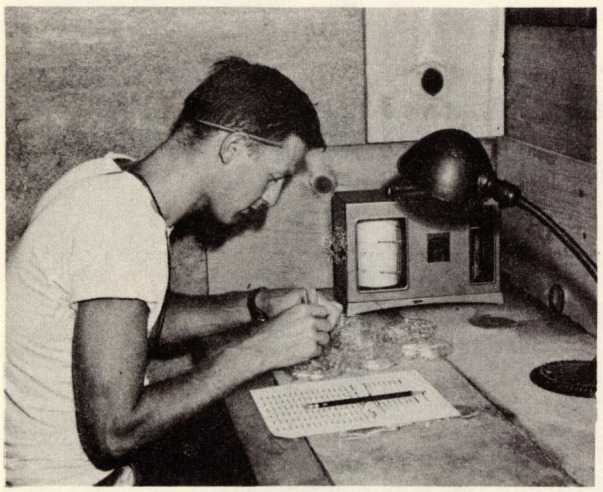
Location: Mariposa County, about 3 miles south of Yosemite National Park on State Highway 41.

Type and Area: In mixed-conifer stands of the Sierra National Forest, this is a seasonal center for study of forest insect problems on the west slopes of the Sierra Nevada. Facilities include: insectary, laboratory, cold-storage room, and darkroom.

Research Program: Biology, ecology, behavior, and control of insects that attack forest trees in the mixed-conifer type. Studies underway include field and laboratory work on residual-type chemical sprays for bark beetle control.







Field laboratories in major forest types permit entomologists to study development of forest insects in their natural environments and work out chemical, biological, or other control methods that hit at the weakest links in the insects' chain of life. Insectary for rearing experiments shown here (center left) is at Placerville; other views at Miami field lab near Oakhurst.

TUOLUMNE MEADOWS FOREST INSECT LABORATORY

Location: Tuolumne County, at the head of Tuolumne Meadows in Yosemite National Park.

Type and Area: Representing high Sierra forests in which lodgepole pine predominates. Other species in order of abundance are mountain hemlock, red fir, western white pine, white bark pine, and Jeffrey pine. Typical of high Sierra country resulting from glacial action in granite peaks.

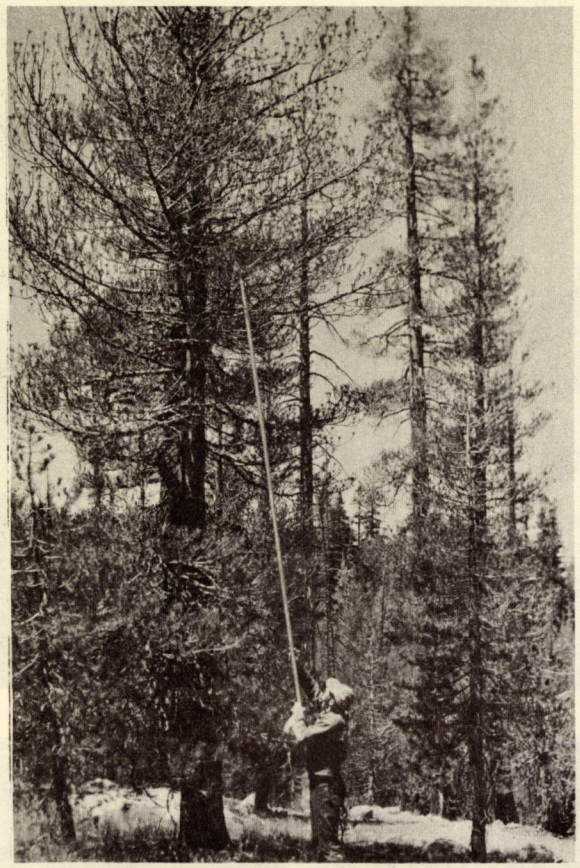
Research Program: Biology, ecology, and control of lodgepole pine needle miner, which has killed lodgepole pine trees on thousands of acres during an outbreak that started in 1947. Studies were begun in 1954 to determine what factors underly the build-up or decline of needle miner populations and to develop control methods. This project is conducted in cooperation with the National Park Service.

ORLEANS FOREST INSECT LABORATORY

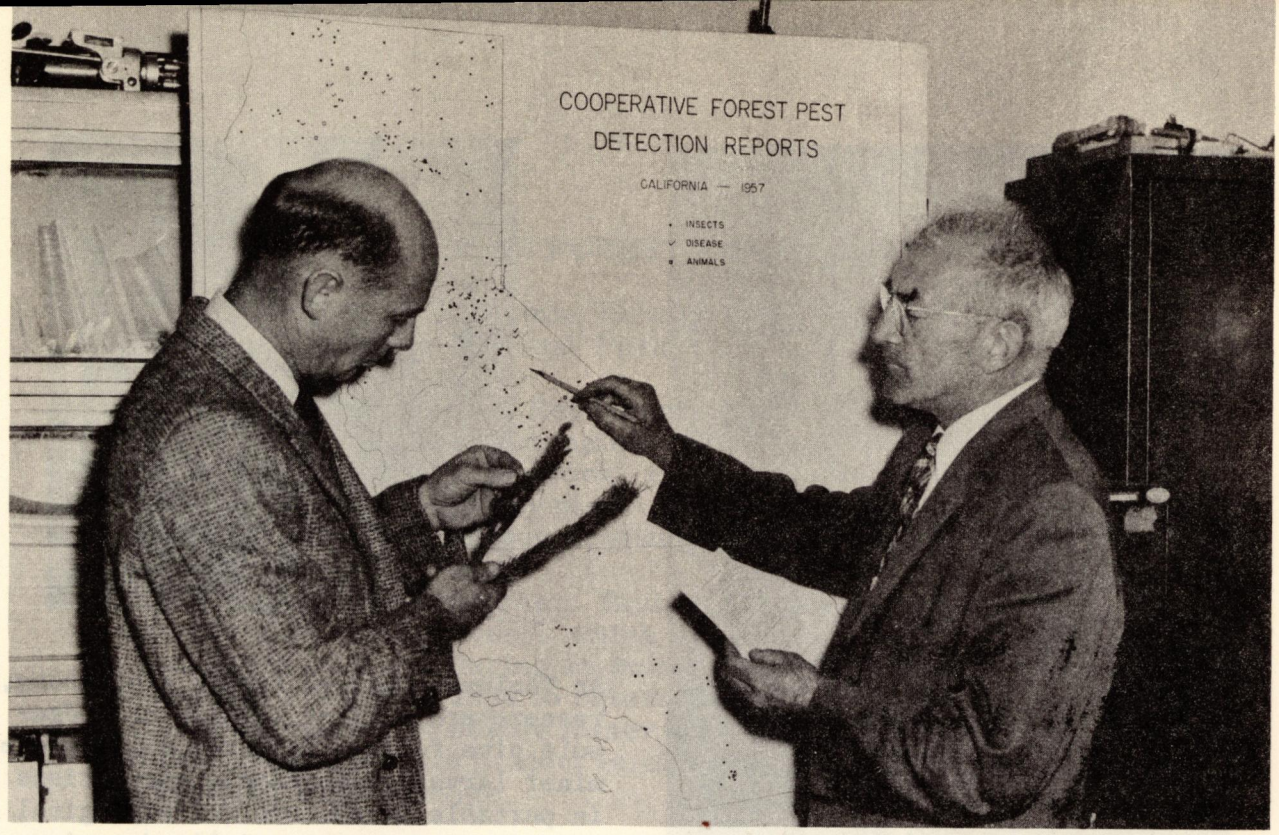
Location: Humboldt County at Orleans on the Klamath River Highway about 90 miles northeast of Eureka.

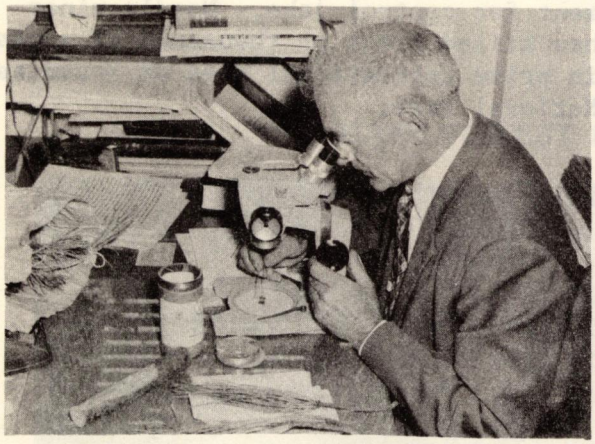
Type and Area: In the heart of California's Douglas-fir belt. Exceedingly rugged terrain, dense stands of timber; wet winters, and cool, relatively dry summers. Facilities include laboratory and insectary.

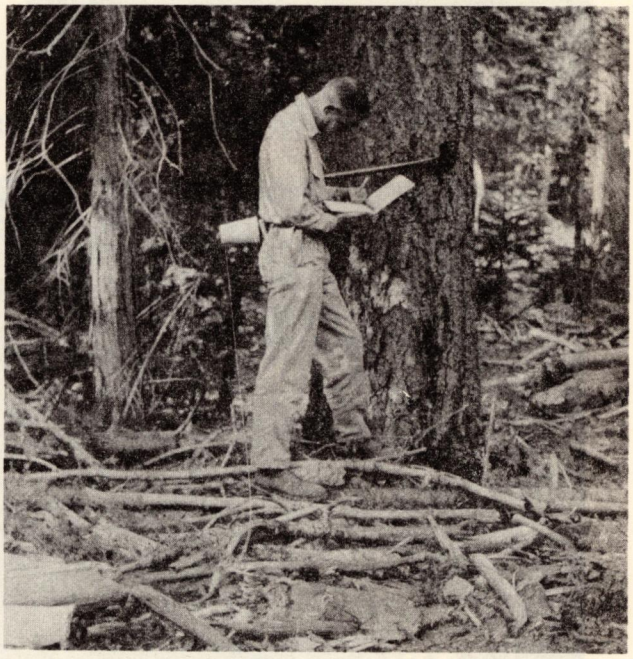
Research Program: Field studies started in 1956 emphasizing work on life histories and habits of Douglas-fir cone and seed insects. Other studies include insects injurious to young trees. The Orleans laboratory also serves as a headquarters for forest insect survey activities in northwestern California.



At Tuolumne Meadows insect laboratory, researchers collect samples of lodgepole pine foliage infested with needle miner larvae, rear sample populations in portable incubators for biological studies, and test specialized equipment for control jobs. Needle miner has killed trees on thousands of acres in prime recreational area of Yosemite National Park.







Forest insect surveys start with detection reports from cooperating public and private foresters. Samples of infested material are examined in Berkeley entomology laboratory. Station specialists make aerial surveys of outbreak areas. Later they check infested trees on the ground and measure amount of timber damage.

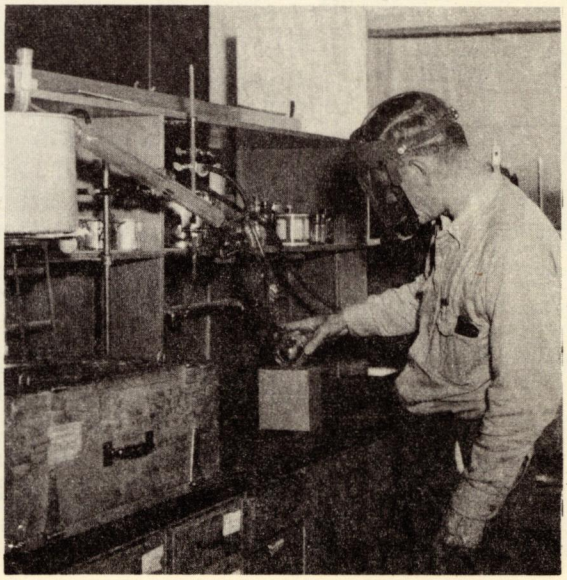
INSTITUTE OF FOREST GENETICS

Location: El Dorado County, about 5 miles east of Placerville by way of U. S. Highway 50.

Type and Area: The oldest forest-tree improvement center in the United States, the Institute of Forest Genetics was established in 1925 by Mr. James G. Eddy and donated in 1935 to the people of the United States for administration by the Forest Service. Its facilities include: the Eddy Arboretum, which is probably the most complete collection of the world's pines, several plantation areas, nursery and greenhouses, warehouse and shop, insectary, and laboratories. The grounds occupy about 106 acres.

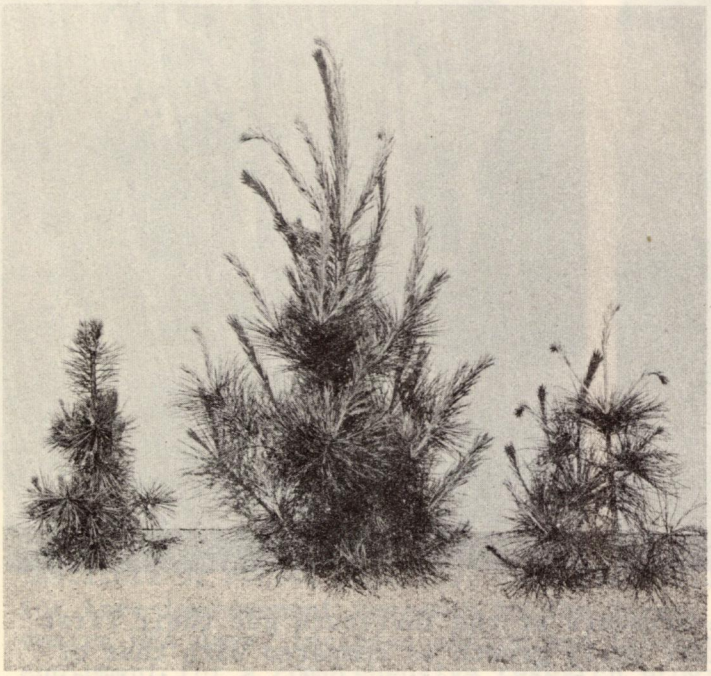
Research Program: Development of superior forest trees through hybridization and selection is the major aim of work at the Institute. Tree breeders there have worked out methods for artificial pollination of pines; using these techniques, they have produced more than 70 hybrids. Some promise faster growth, better resistance to forest pests, or greater tolerance of drought and cold than their parent species. Outstanding hybrids are being tested in plantations on the Institute grounds and many have been planted in forested areas for field trials in different parts of the United States and in foreign countries.

Other studies being carried out at the Institute include basic research on several problems related to forest genetics and forest management research: Why are some trees able to resist insect attack while others are highly susceptible? What causes differences in the growth rate of wood-decaying fungi? What internal chemical processes affect tree growth and reproduction?

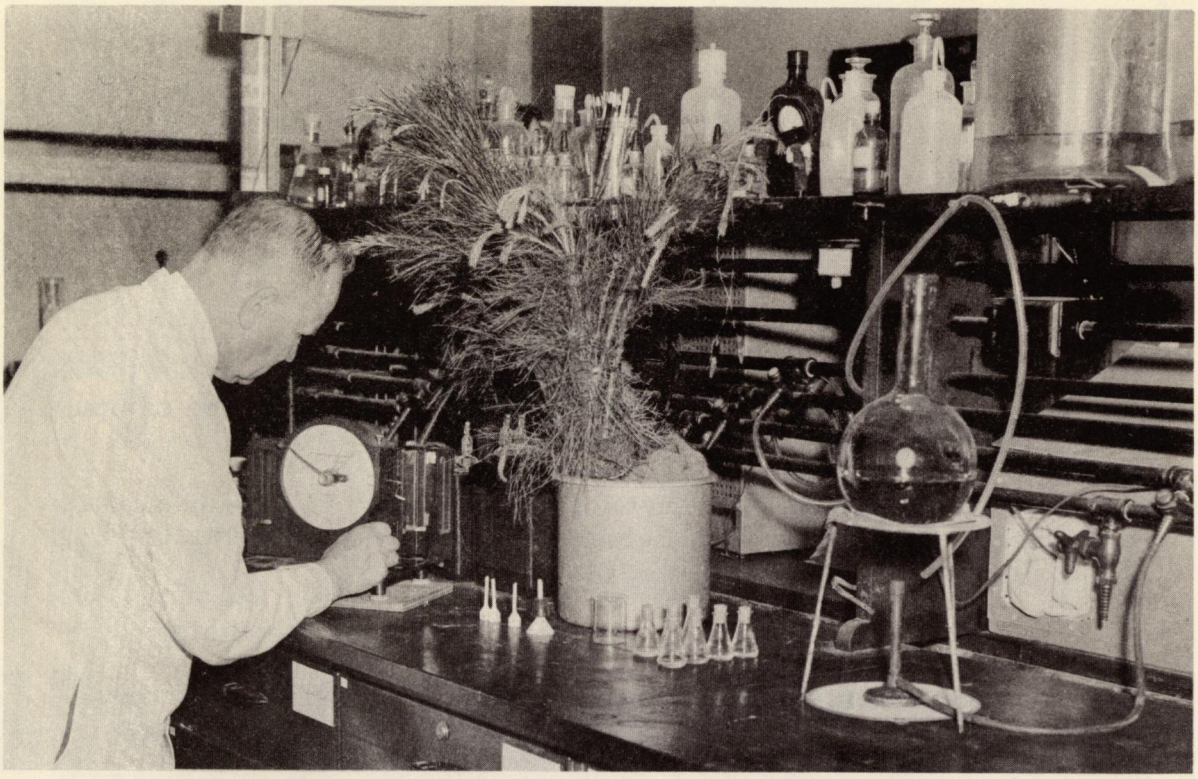


Institute of Forest Genetics, near Placerville, is the western center for tree-improvement research by the Forest Service. Its plant, built during WPA days, includes office and laboratory, staff residences, and equipment for a comprehensive research program--from pollen handling and storage to chemical analysis of tree components--by Station and cooperating scientists.

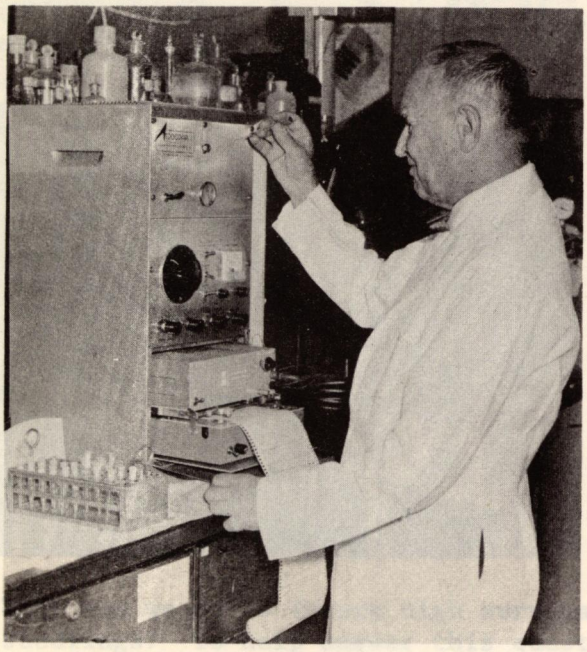
Hybrid pines produced by tree-breeders at the Institute get their first test in nursery beds where their early growth is compared with that of seedlings from parent species. Greenhouse studies work out methods for propagating cuttings and grafts of selected breeding stock.

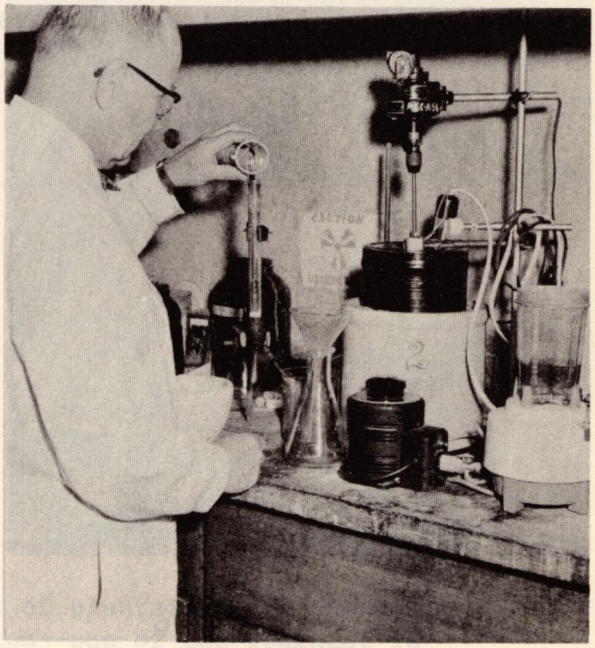


Field trials of pine hybrids in plantations on the Institute grounds provide additional checks of improved forms through several growing seasons. These plantations also serve as breeding stock for further genetics research after the trees reach flowering age. Plantings by Forest Service and cooperating agencies elsewhere test adaptability of hybrids in a wide range of forest sites.



Basic studies in the Station's biochemical laboratory at Berkeley seek new knowledge needed to advance the science of forest genetics--chemical clues to hereditary differences among pines, for example, or to the processes that control flowering and seed production.





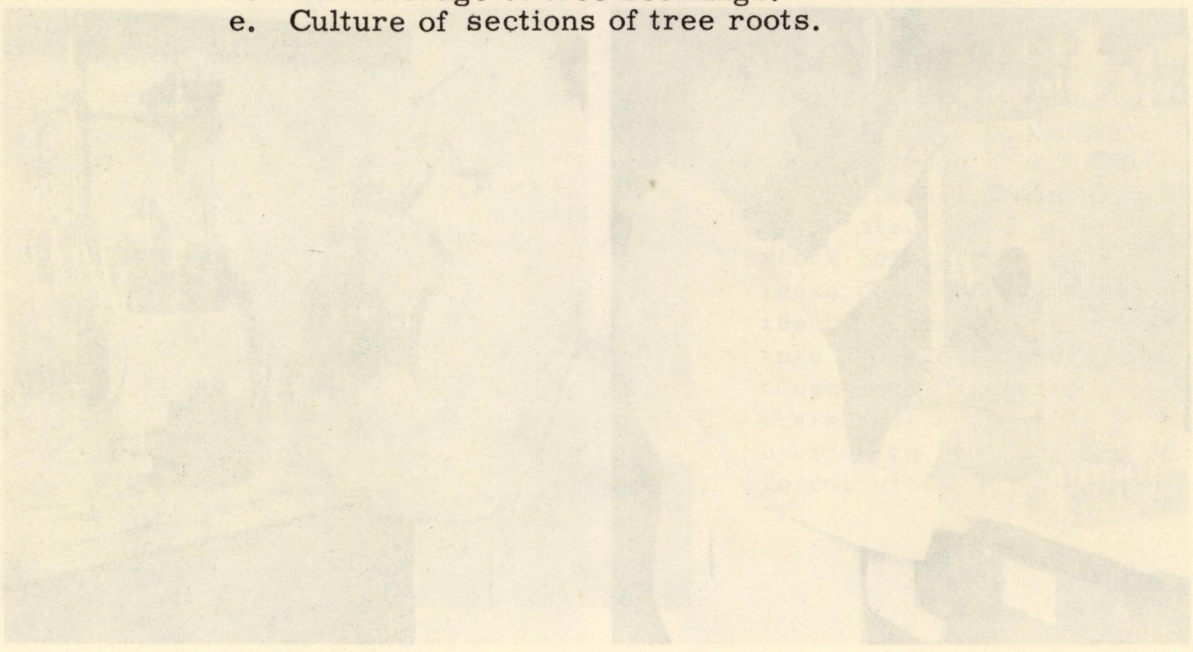
FOREST TREE PHYSIOLOGY LABORATORY

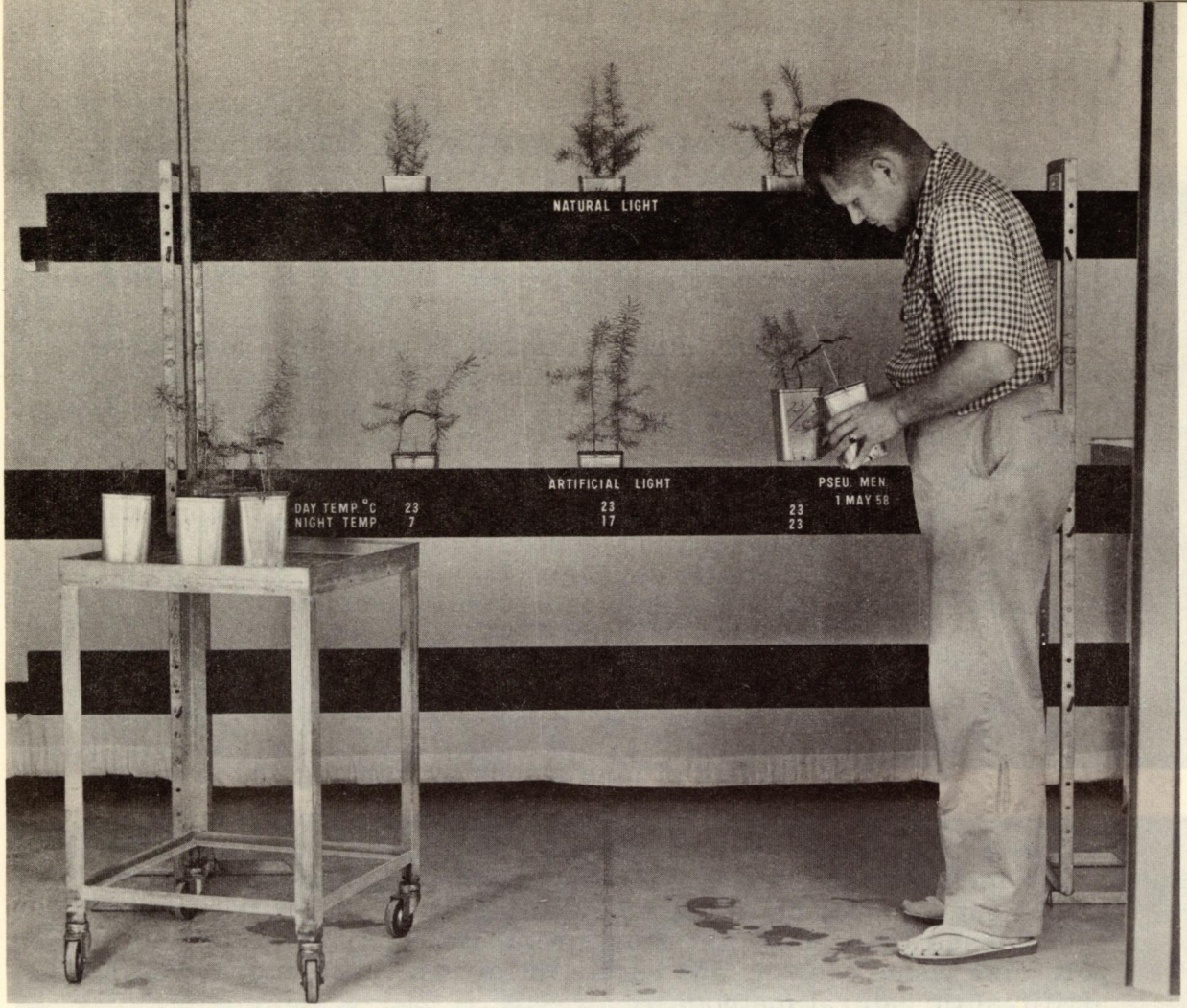
Location: Los Angeles County, Pasadena; on the campus of the California Institute of Technology.

Facilities: Plant physiology laboratories, greenhouses, and Earhart Plant Research Laboratory (for growing plants under controlled environmental conditions).

Research Program: In cooperation with the Biology Department, California Institute of Technology, research is focused upon learning the fundamental physiology of forest trees for the purpose of improving artificial and natural regeneration of forests. Studies underway include:

a. Effects of temperature and light upon germination of tree seed.
b. Effects of gibberillic acid upon tree seed.
c. Photoperiodic responses of trees.
d. Cold storage of tree seedlings.
e. Culture of sections of tree roots.





What can we do to insure high survival of plantations and natural seedlings? To help answer this question--one of the toughest in California forestry--the Station has started basic studies of forest-tree physiology at Pasadena. Through cooperative arrangements with California Institute of Technology, our physiologists are studying growth habits of trees in the controlled environment at Earhart Plant Research Laboratory.

BLACKS MOUNTAIN EXPERIMENTAL FOREST

Location: Lassen County, about 35 miles north of Westwood on the Westwood-Pittville highway. Headquarters at the station's Research Center in Susanville (Room 302 Knoch Bldg., 617 Main Street).

Type and Area: Representative of ponderosa and Jeffrey pine forests in California's northeastern plateau. Includes 10,250 acres on the Lassen National Forest. Facilities include staff residence, dormitories, mess hall, equipment shop, and office-laboratory.

Research Program: The experiment station is conducting experimental logging to test and demonstrate the practical value of forest-management methods developed by research. Experimental cutting began here in 1937. Studies underway include:

a. Methods of reducing tree mortality caused by bark beetles.
b. Regeneration and growth of pine stands after harvest cutting.
c. Improvement of pine stands by thinning and pruning.

During the first 20 years of operation about 70 million board-feet of timber were harvested. At present, about 1 million board-feet per year is being harvested—the calculated allowable annual cut. Emphasis is placed upon improving the distribution of age-classes, harvesting the most overmature timber, releasing pole-size young growth, and regenerating unstocked areas by either artificial or natural methods.

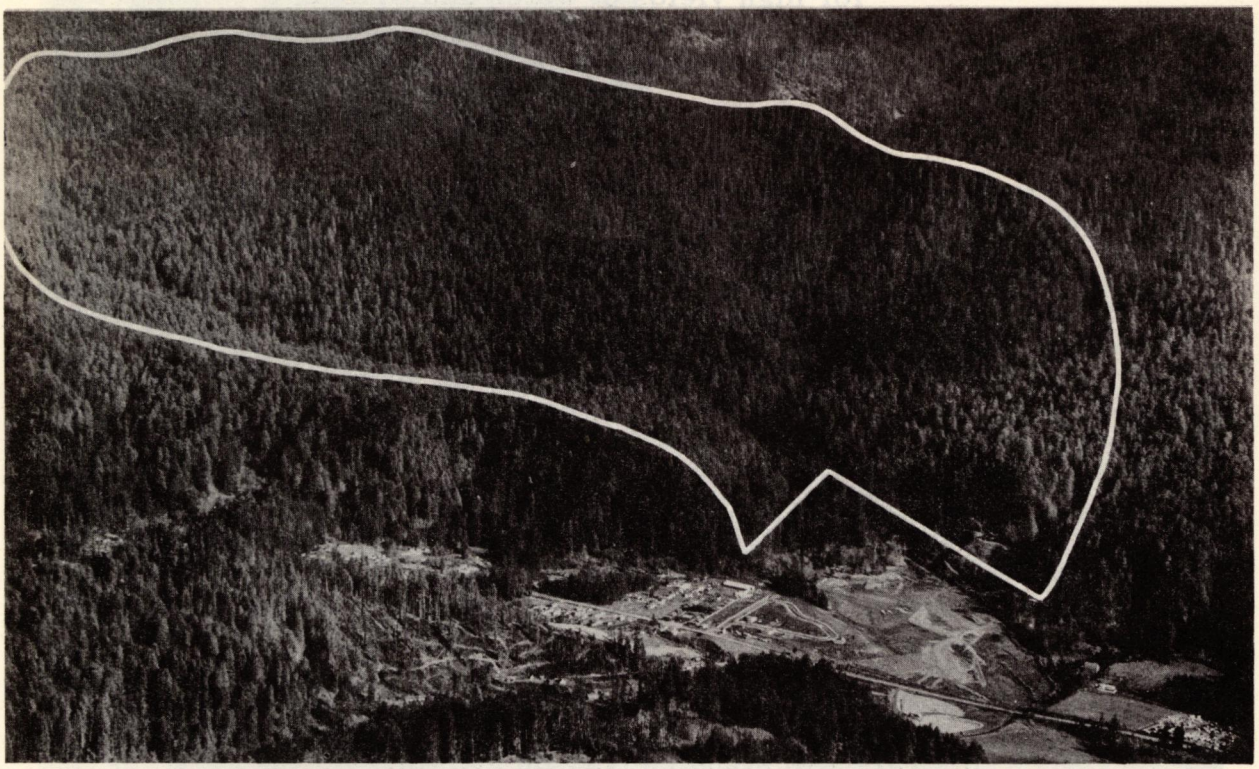
YUROK REDWOOD EXPERIMENTAL FOREST

Location: Del Norte County, 4 miles north of Klamath, California, on U. S. Highway 101.

Type and Area: Representative of North Coast forests of redwood and Douglas-fir. Contains about 955 acres in the Six Rivers National Forest which with 1,170 acres owned by the Simpson Redwood Company encompass the High Prairie Creek watershed.

Research Program: In cooperation with Simpson Redwood Company research on all the watershed is seeking answers to forest management, watershed, and utilization problems in redwood and Douglas-fir timber. The plan for this work, adopted in 1957, includes studies of:

a. Harvest cutting methods—clear-cutting in blocks, shelterwood cutting and selection cutting—to compare even-aged and uneven-aged management.
b. Ecological factors affecting natural regeneration.
c. Effects of logging and road-building on soil erosion and stream sedimentation.
d. Growth of residual stands after cutting.
e. Economics of logging by different methods.



Forest type differences demand management methods suited to different climates, growth rates, products and markets. Biological and economic complexes represented at the Station's experimental forests include the northeastern plateau with open stands of ponderosa pine and Jeffrey pine at Blacks Mountain Experimental Forest (top).....North Coast Ranges with dense stands of redwood and Douglas-fir at Yurok Redwood Experimental Forest (bottom)...

SWAIN MOUNTAIN EXPERIMENTAL FOREST

Location: Plumas County, about 10 miles north of Westwood on the Westwood-Pittville highway. Headquarters at the station's Research Center in Susanville (Room 302 Knoch Bldg., 617 Main Street).

Type and Area: Representative of high-altitude true-fir forests in the Sierra Nevada-Cascade Range. Includes 6,000 acres on the Lassen National Forest.

Research Program: Opened in 1956. Timber will be harvested at the rate of 3 to 4 million board-feet per year. The main purpose here is to develop management methods for stands of white fir and California red fir, including studies of:

a. Timber harvest and regeneration by clear cutting in strips and blocks.
b. Coordination of snowpack and timber management for high yields of water and timber.
c. Coordination of timber management and deer habitat management.

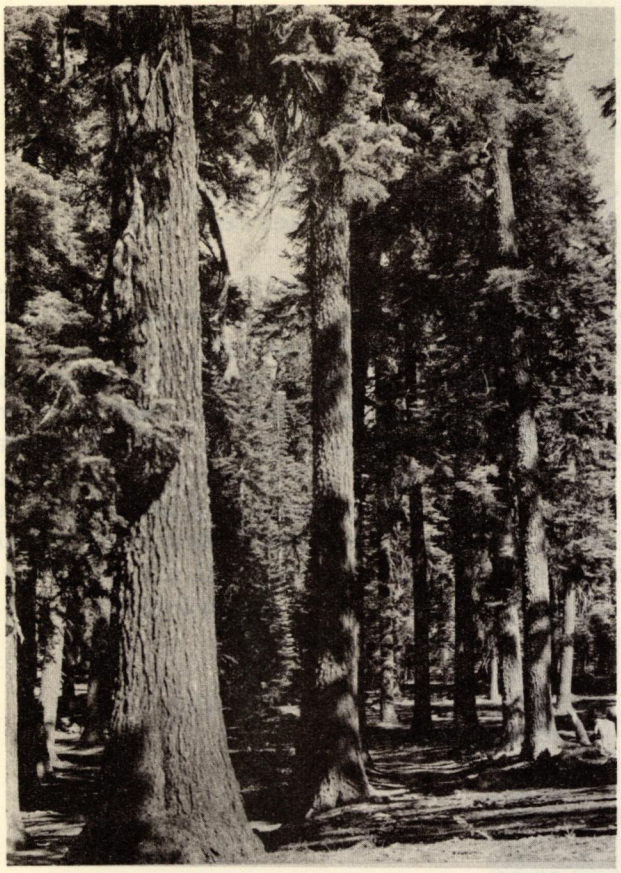
CHALLENGE EXPERIMENTAL FOREST

Location: Yuba County, next to the town of Challenge.

Type and Area: Representative of young-growth ponderosa pine on low-elevation, high-quality timber sites along the western foot of the Sierra Nevada. Includes 2,250 acres on Plumas National Forest.

Research Program: Experimental forest was established several years ago but remained inactive until 1957. Under a cooperative agreement with Soper-Wheeler Company, the following studies are now scheduled:

a. Intermediate and final harvesting of second-growth pine.
b. Effect of stand density on growth.
c. Yield in volume and quality.
d. Regeneration of conifers and control of hardwood brush.



...the high Sierra's dense stands of old red fir and white fir (top) are represented at Swain Mountain Experimental Forest...fast-growing young pines of the lower western Sierra slopes at Challenge Experimental Forest (bottom)...

STANISLAUS EXPERIMENTAL FOREST

Location: Tuolumne County, 30 miles east of Sonora by way of State Highway 108. Ask for directions at Pinecrest District Ranger Station.

Type and Area: Representative of mixed-conifer stands at middle elevations in the westside Sierra Nevada; of high site quality for sugar pine. Includes about 1,500 acres on the Stanislaus National Forest. Facilities include staff house, residences, office-laboratory, and garage and shop.

Research Program: Some of the early research on growth requirements of Sierra Nevada forest trees was done at this outdoor laboratory, and such silvical studies are still an important part of its program. Experimental forest includes an example of unit area control cutting. Studies underway:

a. Regeneration and growth after harvest cutting.
b. Direct seeding and planting methods.
c. Pruning.

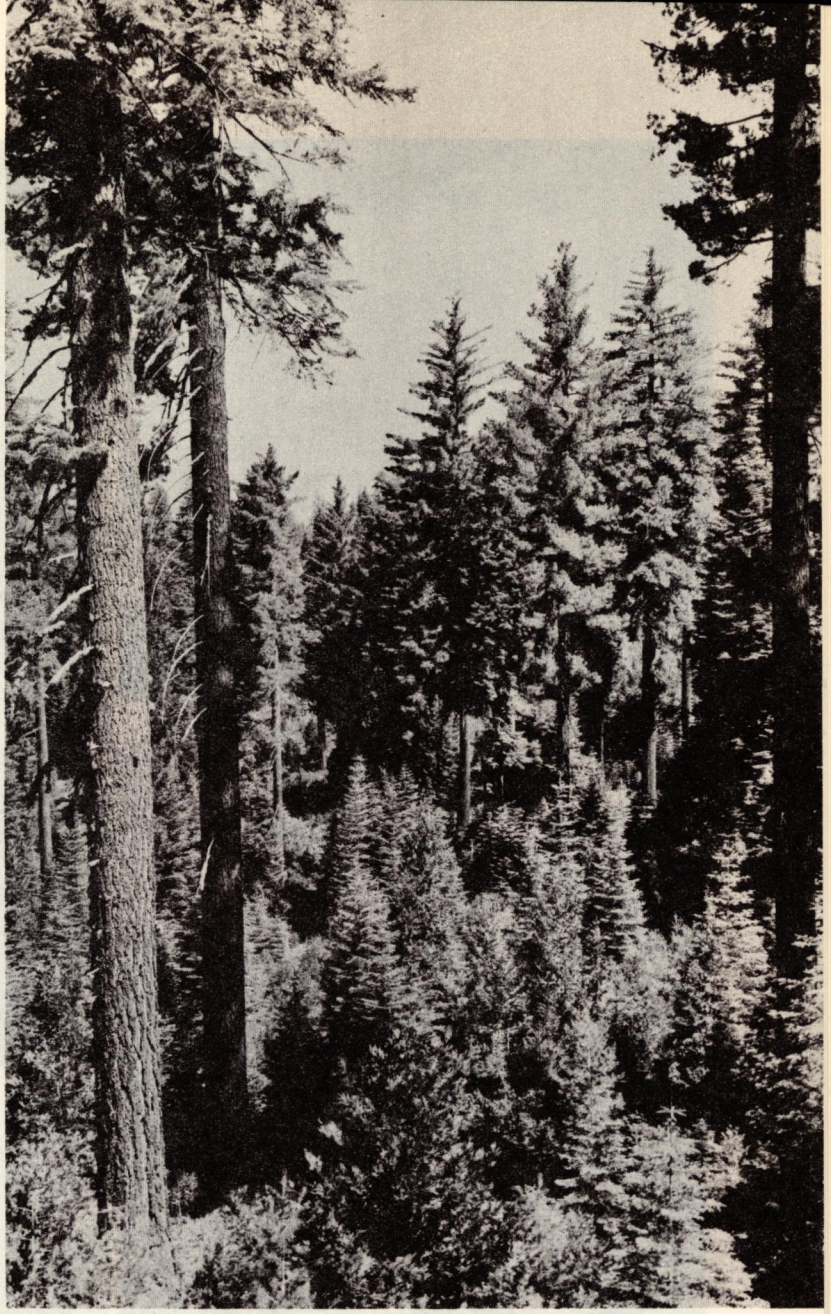
FEATHER RIVER EXPERIMENTAL FOREST

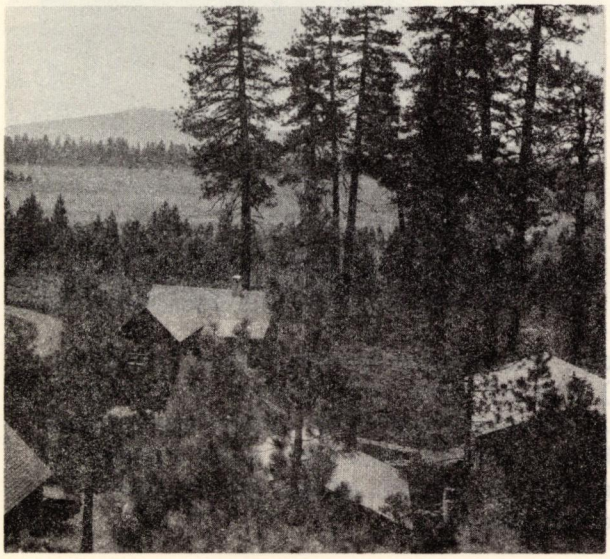
Location: Plumas County, headquarters 4 miles north of Quincy on State Highway 24; experimental forest 8 miles southeast of Quincy on the Quincy-LaPorte road.

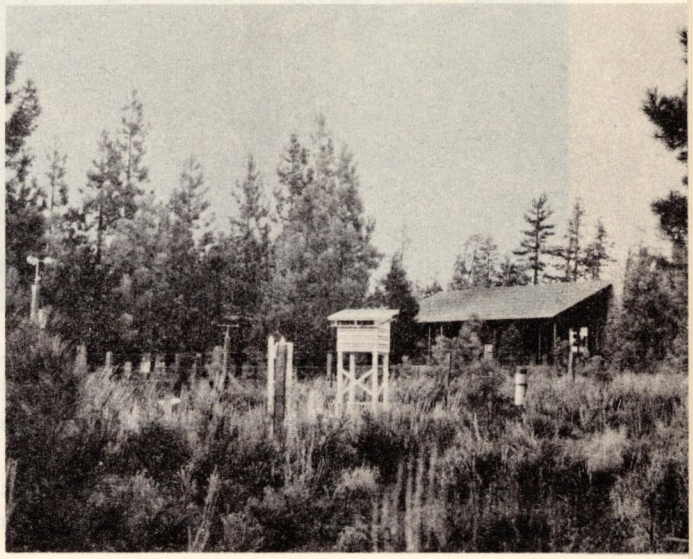
Type and Area: Representative of mixed stands of pine, true firs, Douglas-fir, and incense cedar on the western slopes of the Sierra Nevada. Includes about 4,000 acres on the Plumas National Forest.

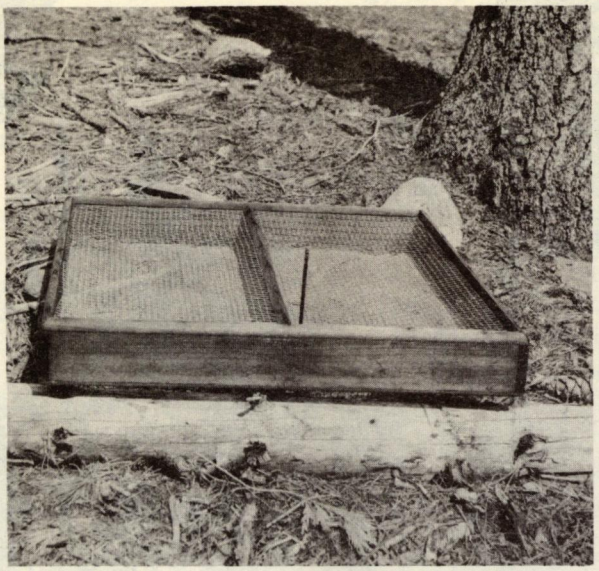
Research Program: Studies near the headquarters were started here as early as 1911, emphasizing planting and nursery problems. Inactive since 1952.

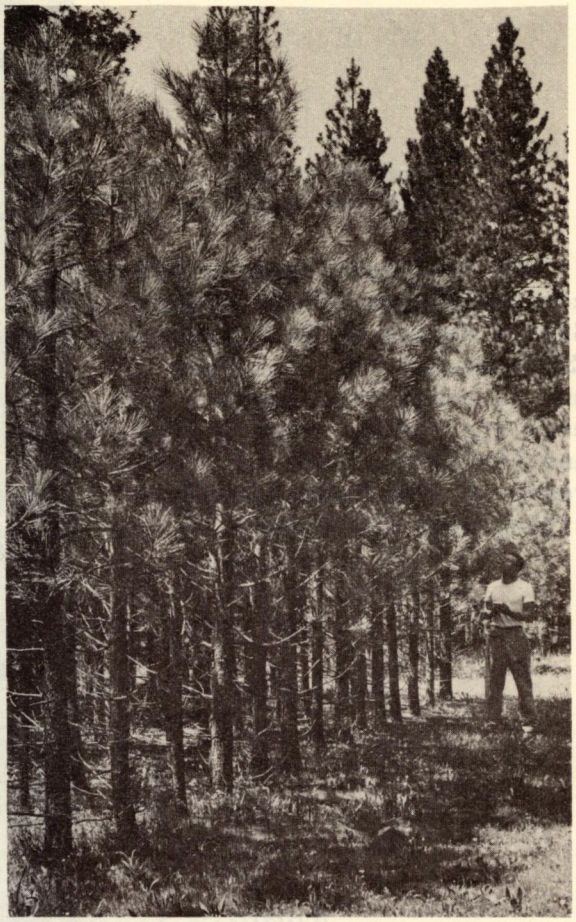
...and the magnificent mixed-conifer stands of the western Sierra Nevada at Stanislaus Experimental Forest...here and at other experimental forests are office, laboratory, and living quarters for field research staff who learn by living with the forest.

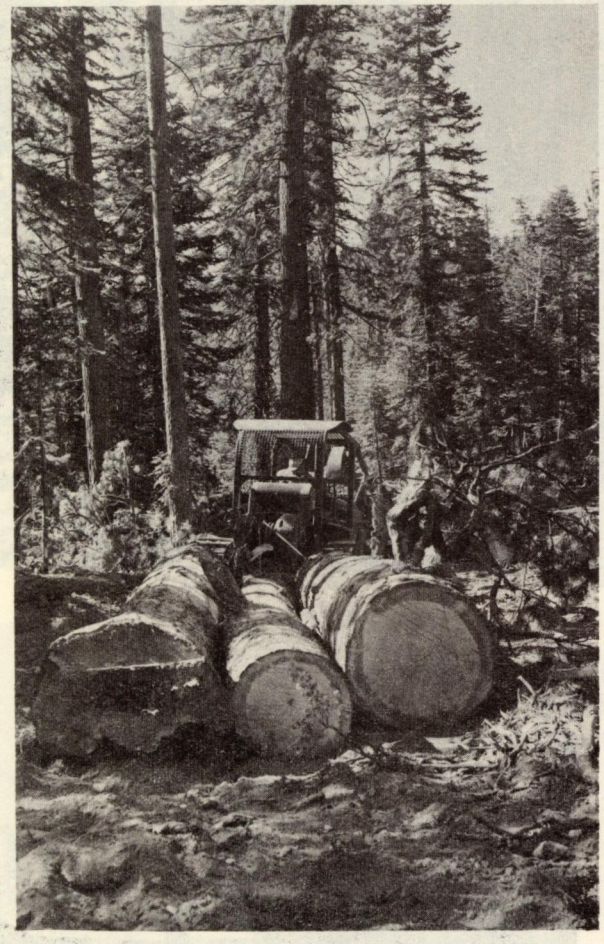


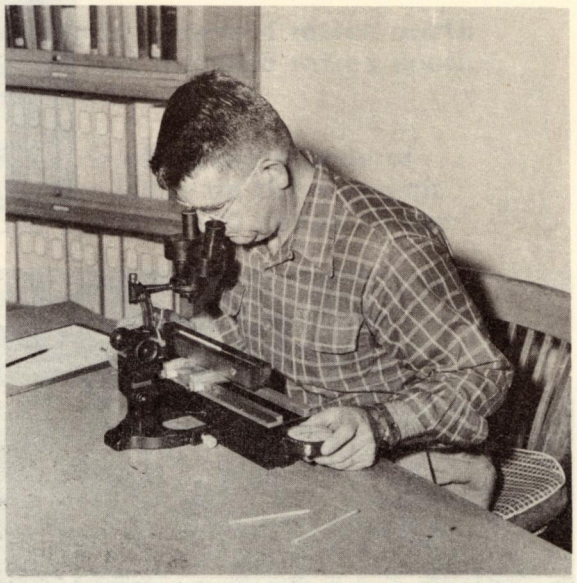




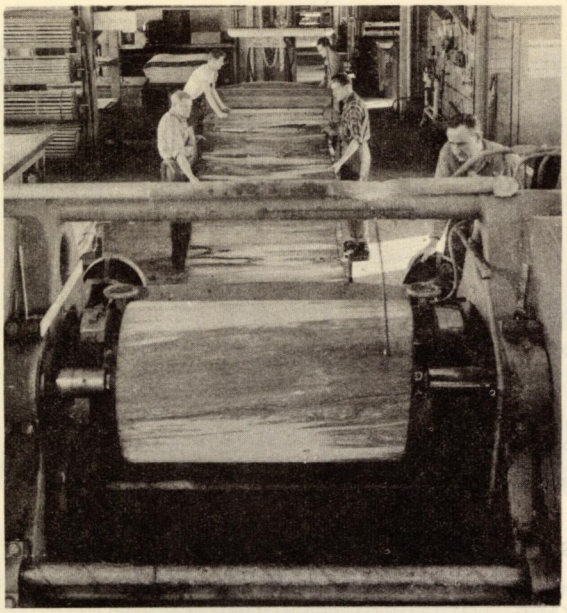


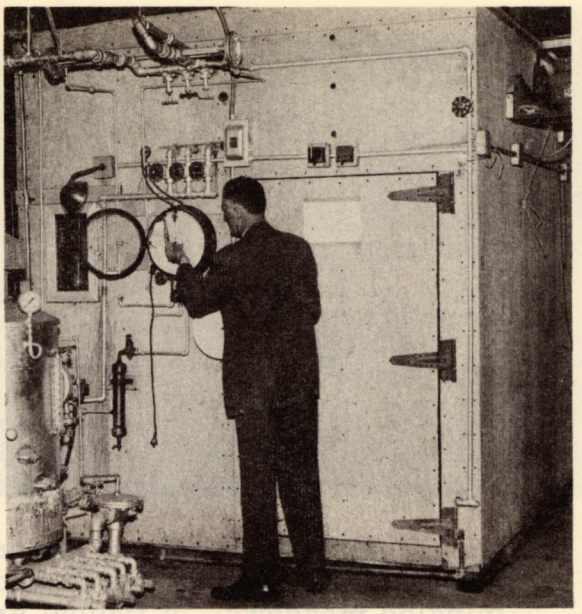


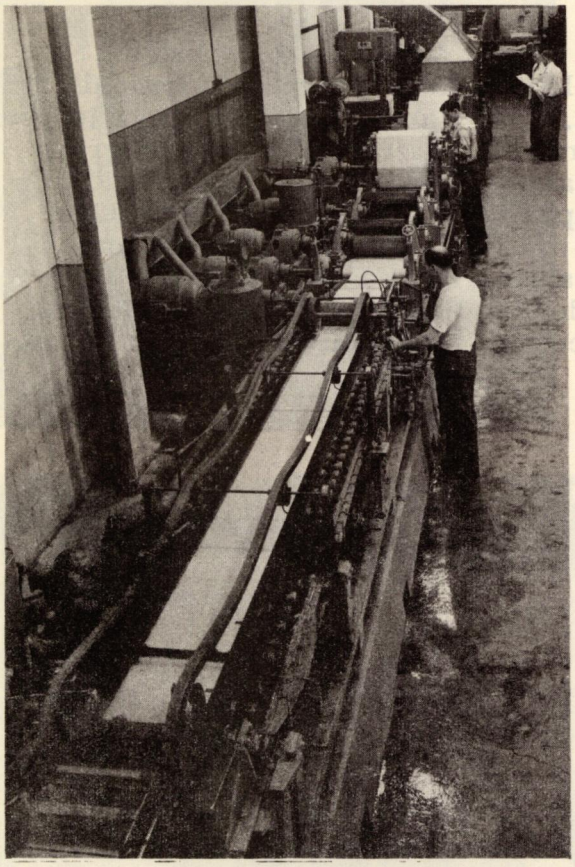




We follow these varied types through their life cycle. The Station has some 500 seed traps (top left) placed over the region to check seed production and dissemination. Plantations help learn what trees to plant--where--when--and how. Experimental cuttings seek proper harvesting methods. Microscopic study of growth rings shows the tree's response to environment and management.







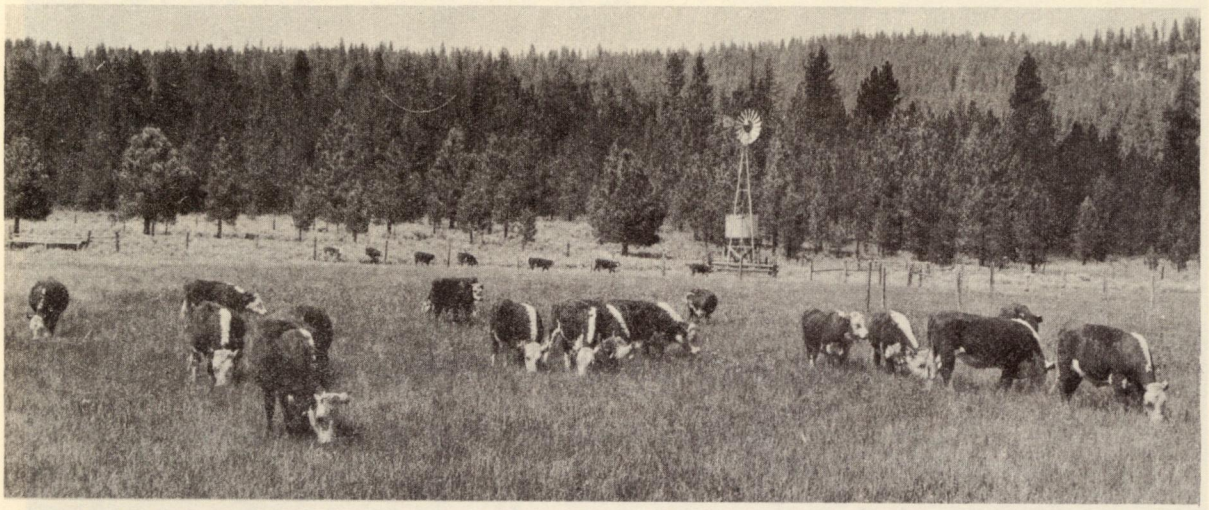
Forest products utilization research at the Station includes local studies, as with portable dry-kiln (upper right) used to solve seasoning problems of California woods. Most problems are referred to U. S. Forest Products Laboratory at Madison, Wisconsin, where equipment like veneer and paper making machines at left, can tackle a full range of basic and applied studies in close coordination with local University and industrial laboratories.

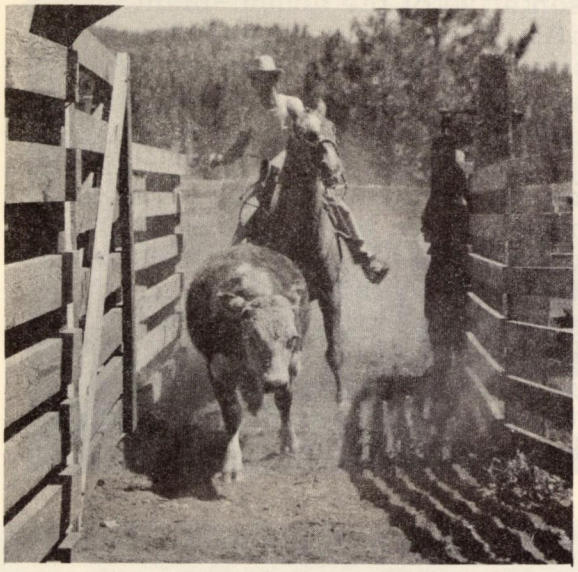
HARVEY VALLEY EXPERIMENTAL RANGE

Location: Lassen County, about 30 miles north of Westwood and east of Westwood-Pittville highway. Headquarters at the Station's Research Center in Susanville.

Type and Area: Representative of perennial type mountain summer ranges including cutover pine timber and intermingled meadows. A typical grazing allotment of about 32,000 acres on the Lassen National Forest.

Research Program: A rest-rotation range management system is getting a full-scale practical test on this typical national-forest grazing allotment. The Harvey Valley system is based on 15 years' study of the growth requirements of bunchgrass plants and the grazing habits of cattle. The system is expected to double the allotment's grazing capacity in 20 years. Its effectiveness is being measured in terms of both herbage production and weight gains of cattle. In cooperation with the Agricultural Research Service, the test includes studies of artificial seeding of range grasses and sagebrush control by chemical sprays.





At Harvey Valley Experimental Range, in Lassen County, a grazing management system designed by research to rebuild perennial bunchgrass ranges is getting a full-scale test on a typical national-forest grazing allotment. Nearby, Agricultural Research Service conducts cooperative tests of new forage plants for range seeding.

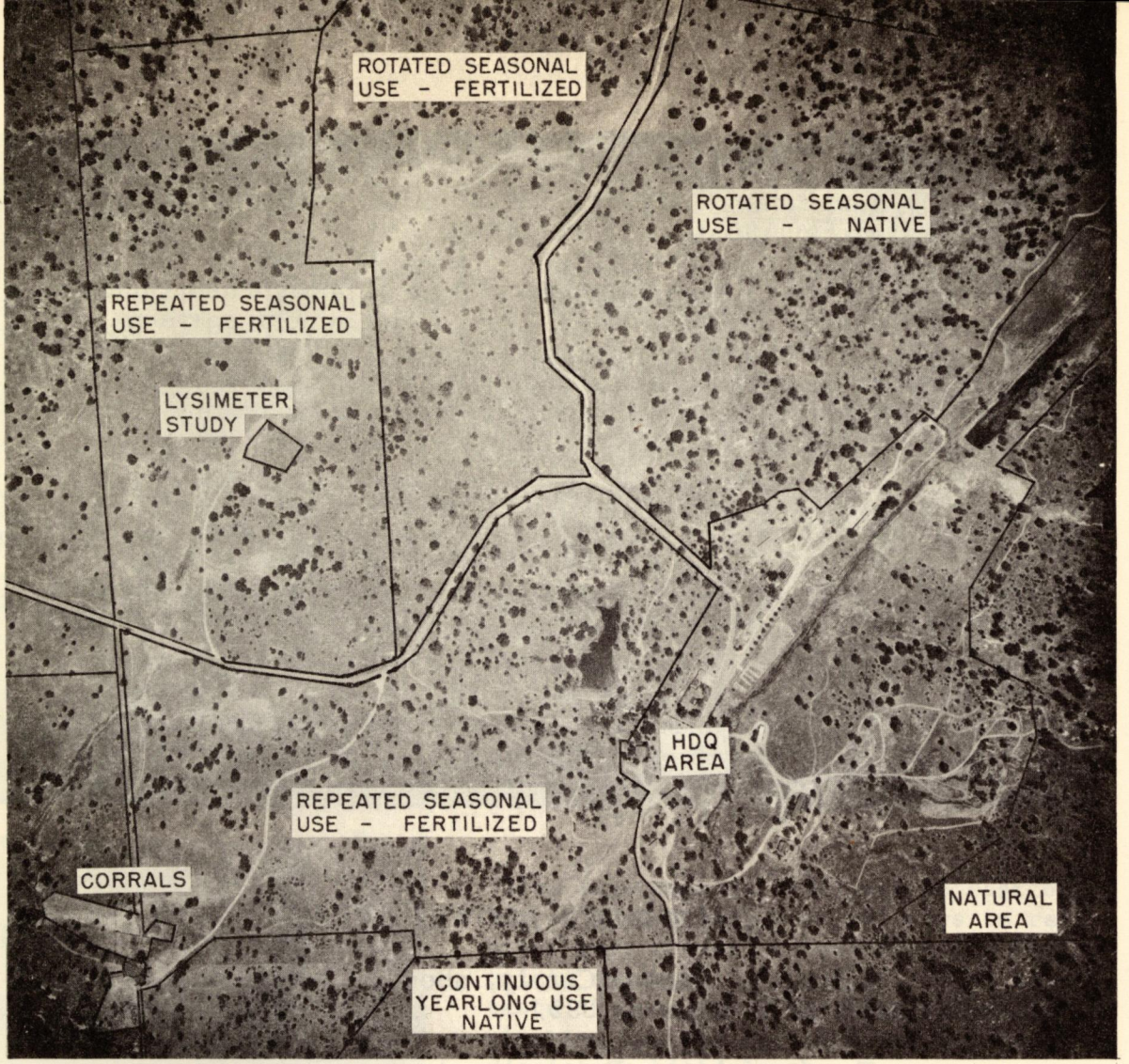
SAN JOAQUIN EXPERIMENTAL RANGE

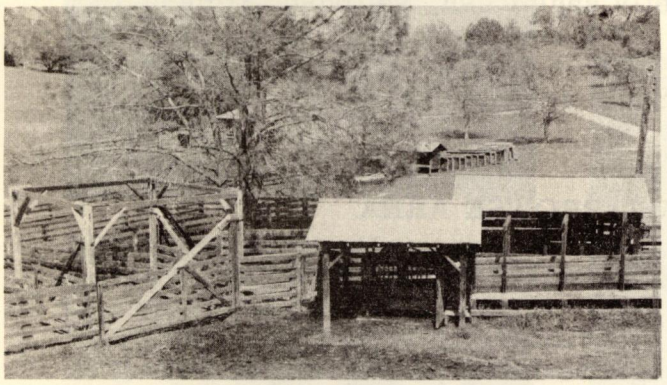
Location: Madera County, about 28 miles north of Fresno on State Highway 41.

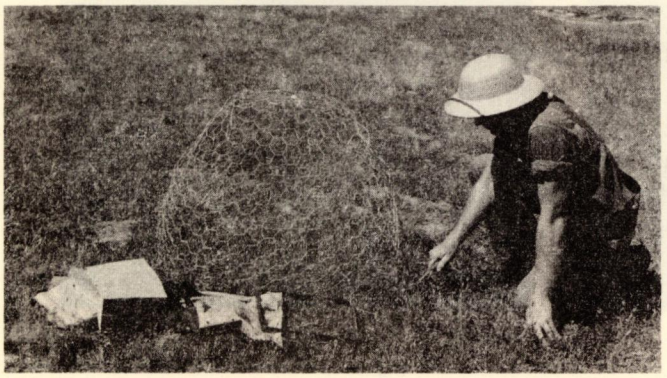
Type and Area: Representative of the annual-plant ranges of the Sierra Nevada foothills, including open grassland and woodland. About 4,600 acres of land near the boundary of Sierra National Forest. Facilities include staff residences, office-laboratory, nursery, and corrals and scales.

Research Program: This is the principal center for U. S. Department of Agriculture research on management of annual-type ranges. Growth requirements of foothill range plants have been established by research started in 1934, and a range management study is scheduled to test the adaptability of two grazing systems to these requirements. Major cooperators include the University of California, which conducts studies of range improvement, and the Agricultural Research Service, which is studying range fertilization and seeding practices. Current Station research includes studies of:

a. Effect of range fertilization on herbage production and livestock gains.
b. Range improvement by removal of brush and tree species.
c. Rotation and non-rotation grazing by seasons on both natural and fertilized annual type ranges.







San Joaquin Experimental Range, near Fresno in the Sierra Nevada foothills, is the Station's chief center for research in the annual-plant range type. Equipped for a comprehensive program of studies on plant ecology, range improvement, and grazing management, this research center also serves as a field lab for Agricultural Research Service and University of California.

FLUKEY SPRING GAME-BROWSE AREA

Location: Modoc County, 20 miles northwest of Canby on State Highway 139.

Type and Area: Representative of bitterbrush, juniper, perennial grass cover on winter deer ranges in northeastern California plateau. One of the three small study areas chosen to represent a variety of climate and soil conditions suitable for growth of browse plants. Flukey Spring has the least dry climate and soil of basaltic origin. At 4, 300 feet elevation.

Research Program: In cooperation with the California Department of Fish and Game, field trials on these areas are seeking ways to seed browse species on deteriorated big-game ranges. Started in 1952, the research program has concentrated on reseeding with bitterbrush. Field trials at the Flukey Spring plots include:

a. Depth and time of planting.
b. Effect of competing vegetation on establishment and growth of browse species.
c. Growth habits of bitterbrush strains from different seed sources.

DOYLE GAME-BROWSE AREA

Location: Lassen County, about 43 miles south of Susanville on U. S. Highway 395.

Type and Area: Drier climate than Flukey Spring, granitic soil, and vegetation chiefly sagebrush, saltbush, some bitterbrush and annual grasses. At 4, 300 feet elevation.

Research Program: Same as at Flukey Spring.

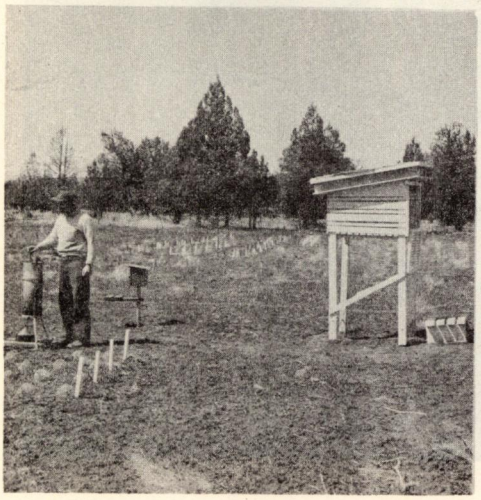
BUTTERMILK GAME-BROWSE AREA

Location: Inyo County, 11 miles west of Bishop.

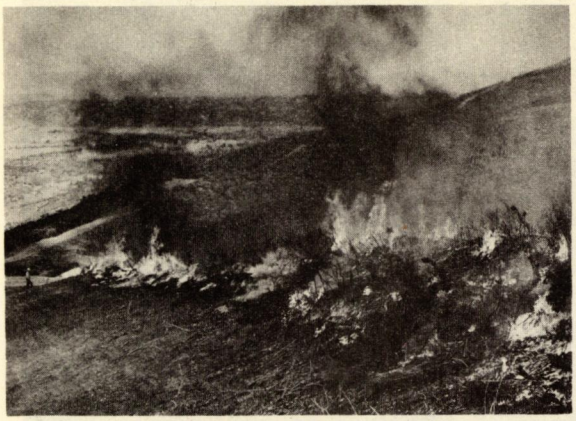
Type and Area: Very dry climate, granitic soil, and vegetation chiefly bitterbrush, sagebrush and perennial grasses. At 6, 200 feet elevation.

Research Program: Field trials starting in the spring of 1958 will include:

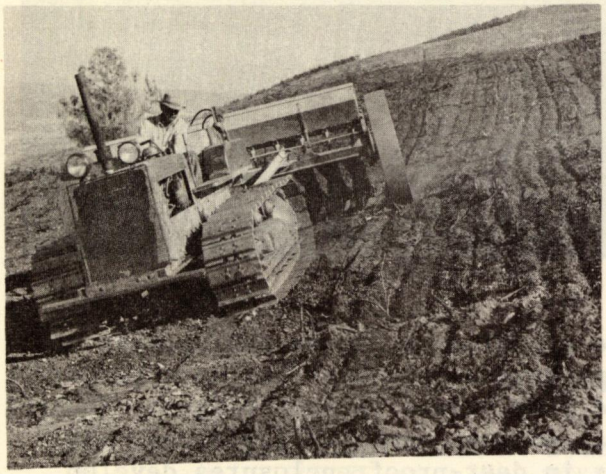
a. Depth and time of planting.
b. Growth of different strains of bitterbrush.
c. Adaptability of different browse species.



Three experimental areas set up east of Sierra Nevada help work out ways to restore game browse on deer ranges. Ecological surveys spot problem areas, and tests in deer-proof enclosures develop planting methods for such key browse species as bitterbrush.



Brushland improvement studies are conducted at San Joaquin Experimental Range and many temporary experimental areas. Pictured here is a new large-scale trial on Mendocino National Forest; it is showing the most effective way to convert chamise-chaparral to grass land in northern California.



SAN DIMAS EXPERIMENTAL FOREST

Location: Los Angeles County, San Gabriel Mountains northeast of Glendora. Experimental forest closed to public; ask for entry permit and directions at Station's research center, Forest Service Building, corner of Foothill Boulevard and Wabash Avenue in Glendora (17 miles east of Pasadena via U. S. Highway 66).

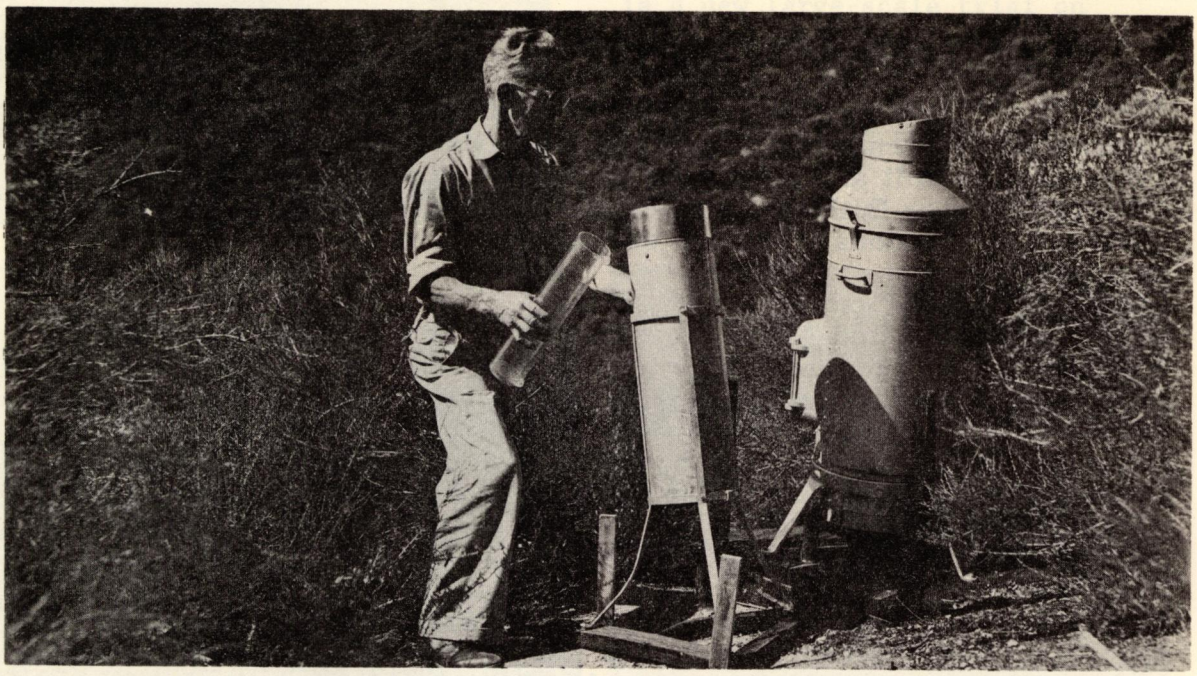
Type and Area: Representative of the chaparral-covered mountains of southern California. Includes 17,000 acres in San Dimas and Big Dalton Canyons on the Angeles National Forest.

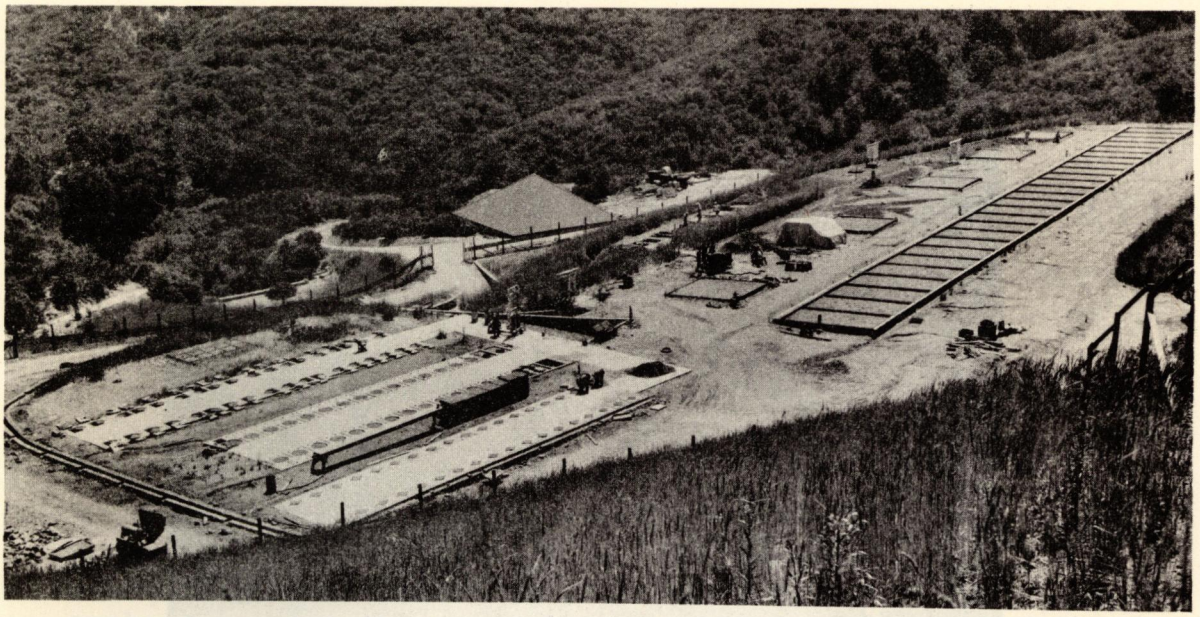
Research Program: This is the principal center for research on methods of managing watersheds in the chaparral type. Conducted in cooperation with the California Division of Forestry, the program has these broad objectives:

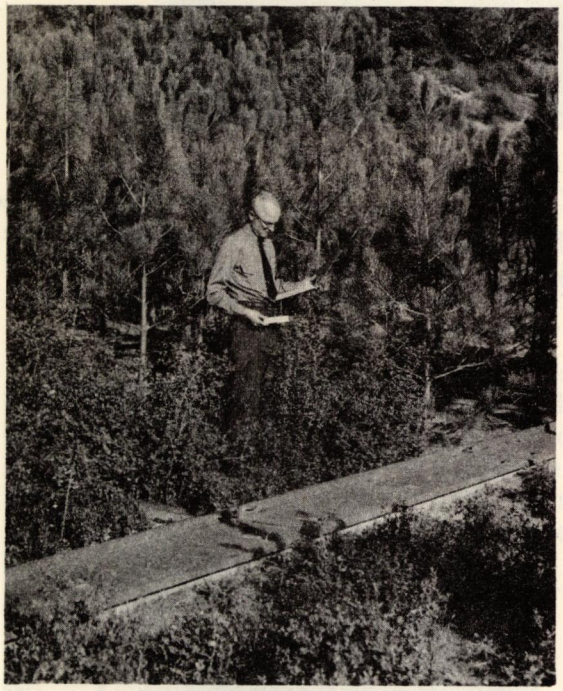
a. Measurement and evaluation of precipitation, streamflow, evaporative water losses, and erosion in relation to natural conditions of vegetation, soil, geology, and topography.
b. Development of watershed management methods to obtain the maximum yield of usable water with the minimum of good runoff and erosion.
c. Evaluation of effects of forest fire on streamflow and erosion.

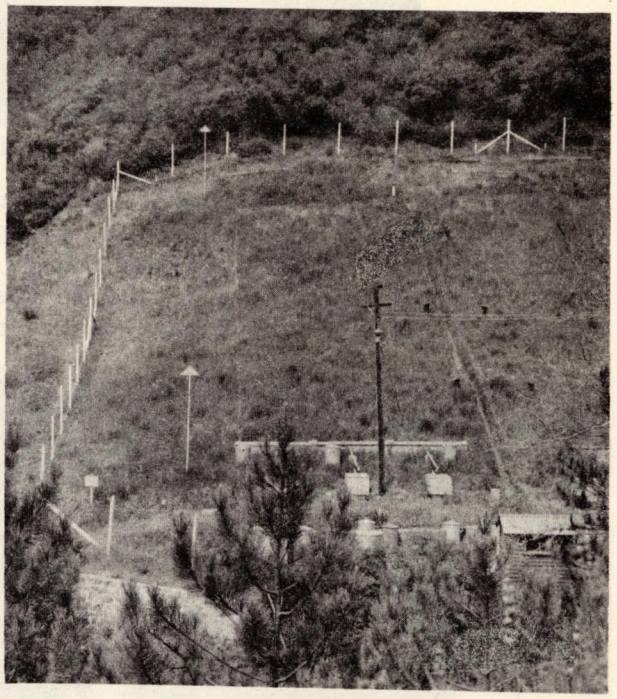
Basic research started 25 years ago has uncovered much fundamental knowledge: how to measure rainfall accurately in this forest type, how chaparral plants differ in water use, how soil moisture and surface runoff are influenced by different kinds of cover, and how to account for rainfall, moisture losses, streamflow, and ground water yields on entire watersheds. This fundamental knowledge is now being applied on whole watersheds to see how much more good water can be produced by research-guided management.

San Dimas Experimental Forest, 17,000 acres of chaparral-covered mountains, is the Station's principal center for brushland watershed research in southern California. Its instruments record the behavior of water from storm clouds to reservoirs, and its laboratories are equipped to study soil and vegetation that influence streamflow and water quality.

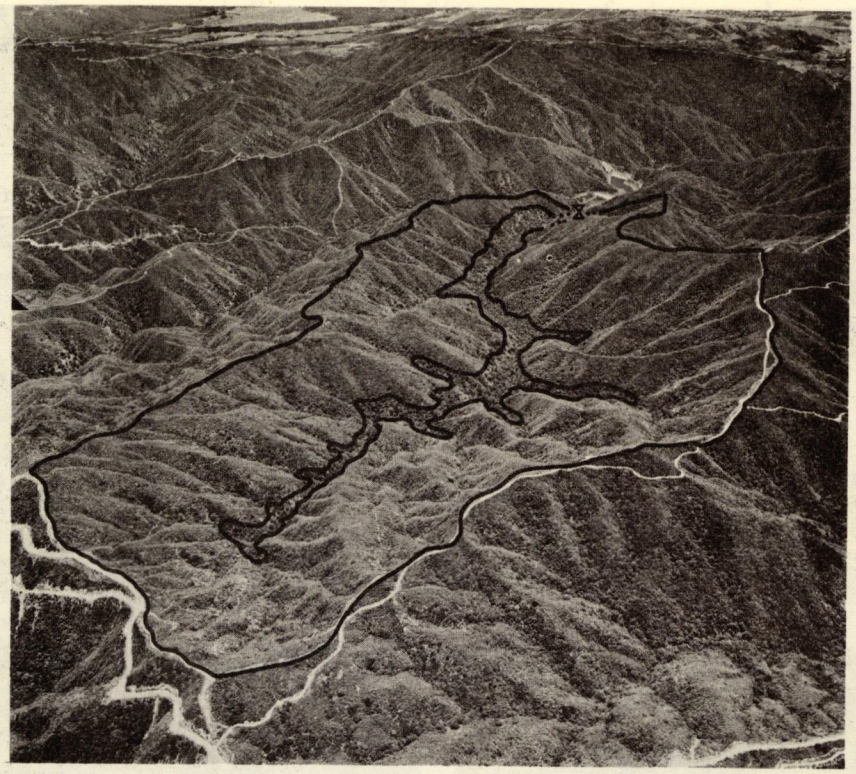




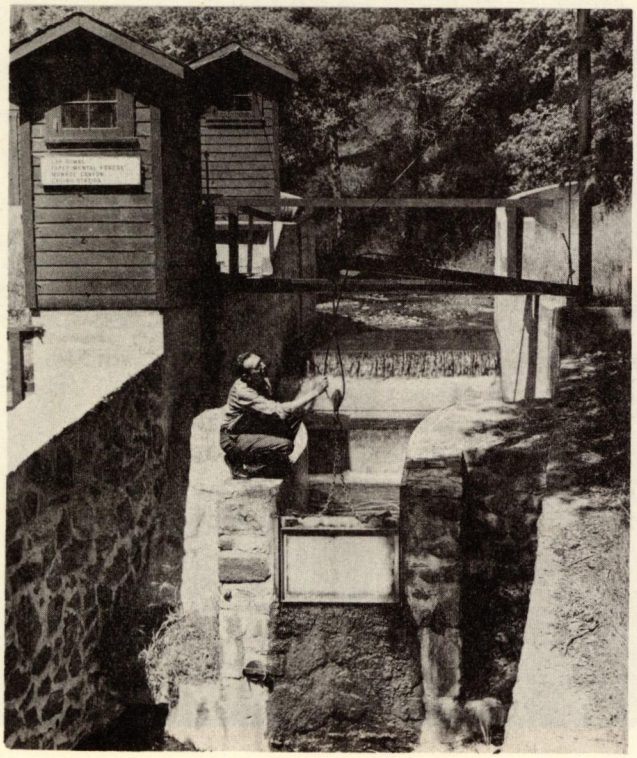


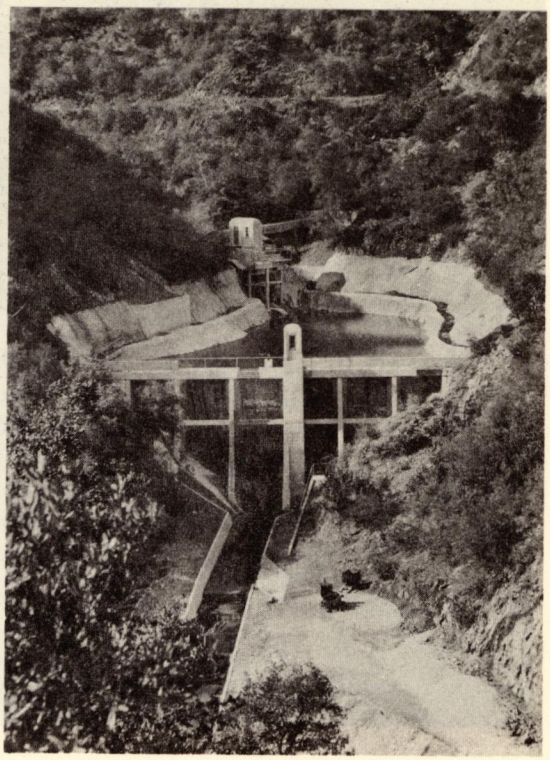


Batteries of lysimeters at San Dimas, supplemented by electrical and radioactive meters, keep tabs on the march of moisture through the soil. Vegetation planted in the lysimeters makes it possible to measure the amount of water used by different kinds of chaparral plants. Land management practices suggested by these basic studies are further tested on soil-moisture and runoff plots--some growing brush, others grasses and herbs.



Monroe Canyon at San Dimas Experimental Forest is the site of new applied studies in brushland watershed management. Researchers are changing the vegetation in stream bottoms and on side slopes. Gaging stations and reservoirs, calibrated during 25 years of fundamental watershed studies, measure the effects of management on water yield and sedimentation.





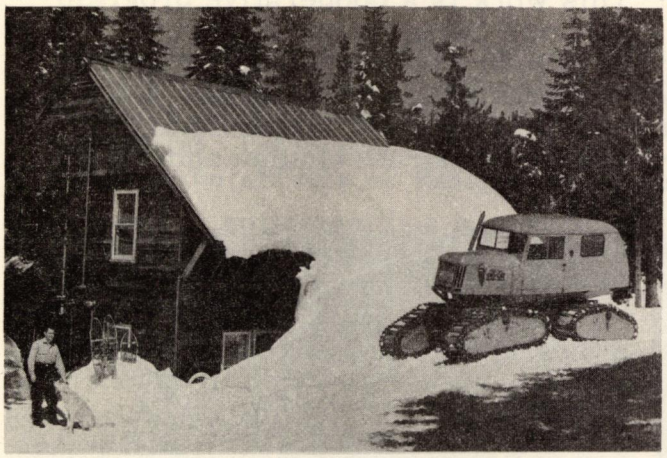
CENTRAL SIERRA SNOW LABORATORY

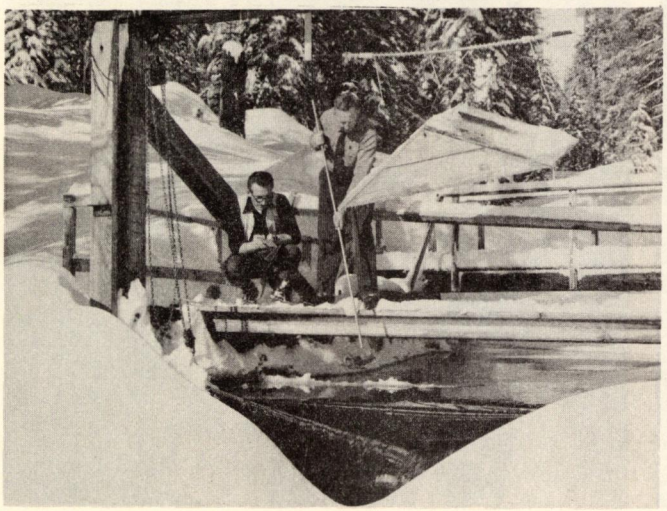
Location: Nevada County, 2 miles west of Donner Summit on U. S. Highway 40.

Type and Area: Representative of high-elevation forests in the snow zone of the Sierra Nevada. Includes 2,540-acre field headquarters at Castle Creek, equipped for basic studies of meteorology, snow physics, and streamflow, and 3,050-acre Onion Creek drainage nearby, including 4 experimental watersheds equipped with stream-gaging stations and sediment traps. Office-laboratory and staff residences at Castle Creek.

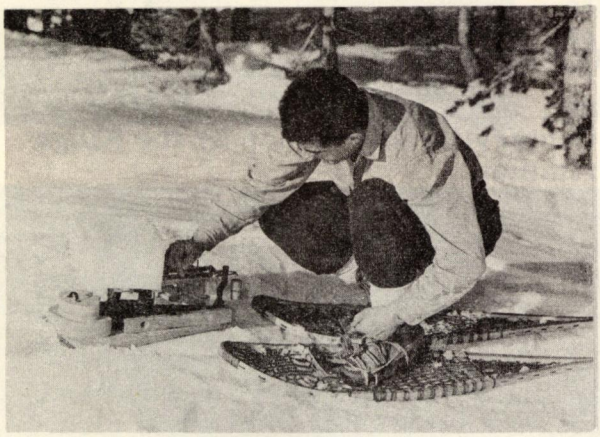
Research Program: This work is a cooperative program of the Forest Service and the California Department of Water Resources. At Castle Creek, the primary aim is to gain an understanding of the behavior of snow in forested and open areas, and to measure the effect of changed conditions on snow accumulation, snow melt, and yield of water. Twelve separate studies underway.

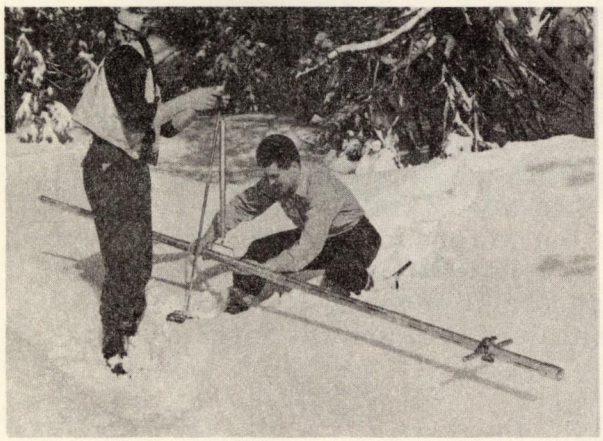
At Onion Creek, streamflow and sedimentation in experimental watersheds will be calibrated for about 5 years. Then methods of cutting timber and other practices suggested by basic studies at Castle Creek will be tested. These tests, and similar ones at Teakettle Creek and elsewhere, will lead to recommendations for management methods to increase water yield from the Sierra Nevada snowpack.





Central Sierra Snow Laboratory, in Castle Creek drainage near Donner summit, is field headquarters for cooperative snow management research. Office and residences are maintained year-around for research staff conducting basic studies of snow physics and streamflow behavior.





Onion Creek watersheds, near the Snow Lab., are being calibrated for full-scale tests of management practices. Here and at Castle Creek, regular measurement of snow conditions and small gaging stations keep track of experiments' progress.

TEAKETTLE CREEK EXPERIMENTAL FOREST

Location: Fresno County, about 73 miles east of Fresno in the North Fork drainage of Kings River.

Type and Area: Representative of mixed-conifer and true-fir forests in the snow zone of the Sierra Nevada. Includes 1,900 acres on the Sierra National Forest.

Research Program: Five watersheds in this area are equipped with reservoirs and stream-gaging stations to evaluate forest management practices designed to improve the yield of water from the snow pack. Calibration of streamflow and sedimentation under natural conditions was started in 1956. After about 5 years, cutting practices suggested by basic snow studies at the Central Sierra Snow Laboratory will be tested on the calibrated watersheds.

SAGEHEN EXPERIMENTAL WATERSHED

Location: Nevada County, near Hobart Mills on State Highway 89.

Type and Area: East-side mixed conifer and mountain meadow types. Includes 7,000 acres in the Tahoe National Forest.

Research Program: In cooperation with the Department of Zoology of the University of California, the Station is studying the effects of land treatment on streamflow, sedimentation, and fish habitat. Fish habitat studies by the University have been underway since 1952. Sedimentation phases of the cooperative study were started in 1957

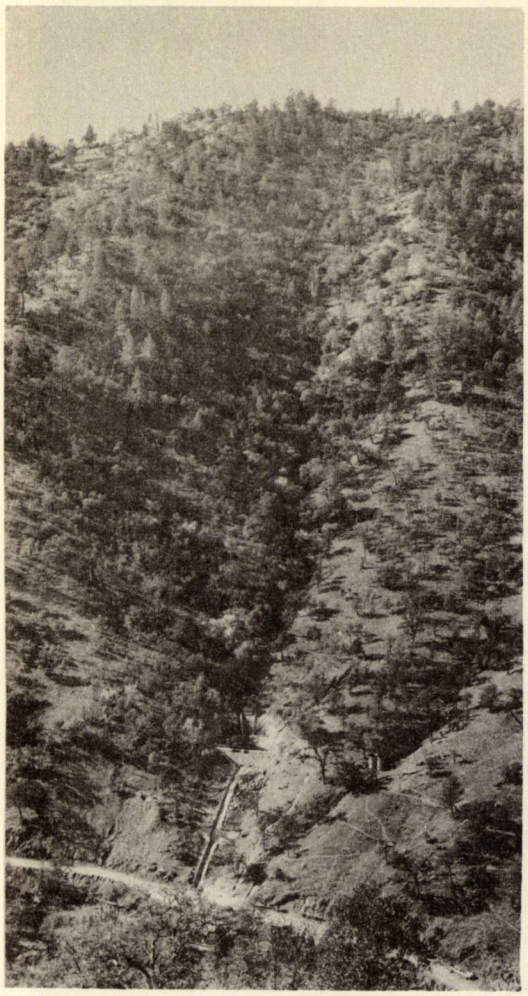
BIG CREEK EXPERIMENTAL WATERSHED

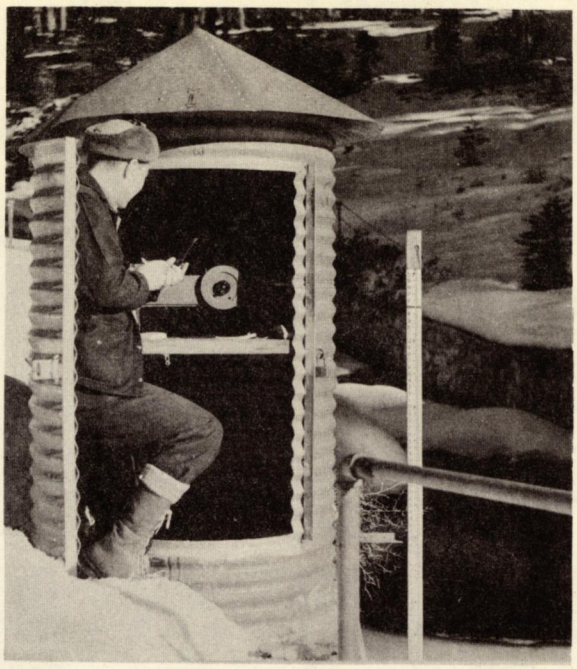
Location: Fresno County, about 40 miles northeast of Fresno via State Highway 180 to Centerville and thence by the Kings River road through Piedra and Trimmer.

Type and Area: Representative of woodland-grass type of Sierra Nevada foothills at elevations of 1,000 to 2,150 feet. Includes 200 acres on the Sierra National Forest in 8 small watersheds of 9 to 36 acres each.

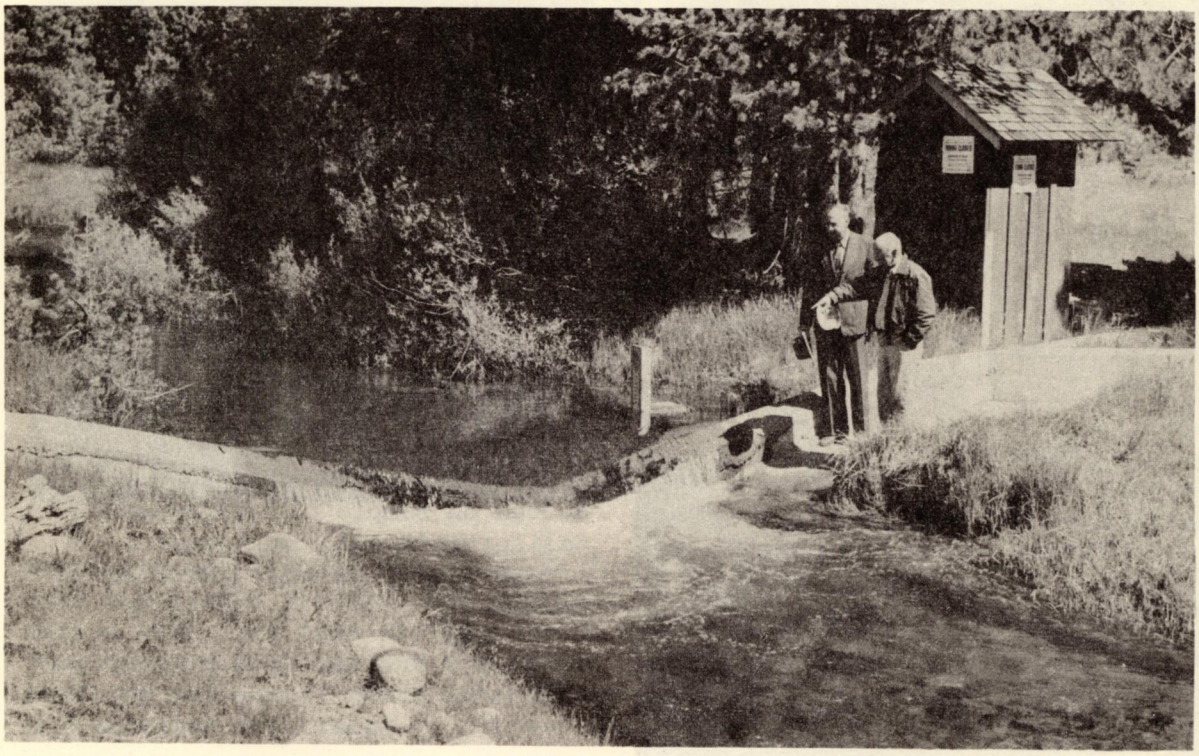
Research Program: Objective of the studies is to determine the best way or ways of managing foothill land in the woodland-grass cover type to obtain the maximum yield of water that is clear and usable. The gaging stations and small reservoirs needed to measure streamflow and sediment discharge were installed in the late 1930's. Their operation was suspended during World War II and thereafter, except for infrequent measurements of debris caught in the reservoirs.

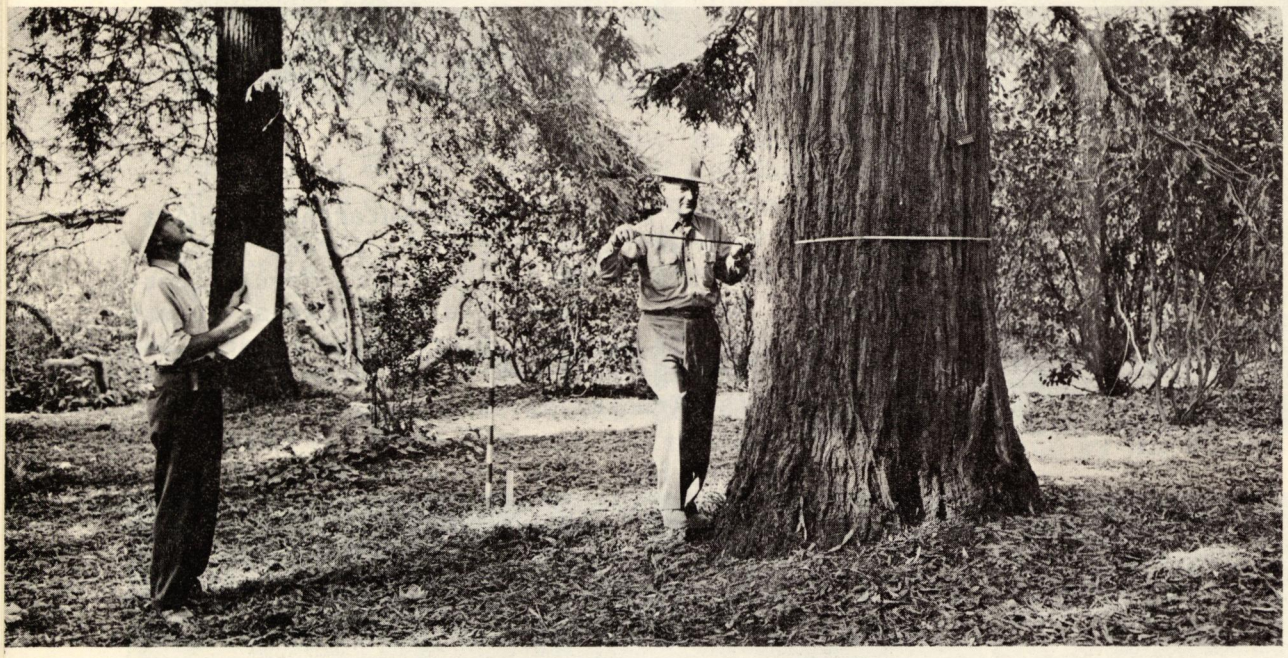
Present plans call for reactivating the study at the earliest date. Precipitation, streamflow, sediment yield, and soil moisture will be measured for a 3 to 5 year calibration period, with no change in present uses of the watersheds. Treatments designed to increase the yield of usable water will then be applied to individual watersheds. The hydrologic measurements will be continued for at least 5 years thereafter to learn the effects of the treatment.



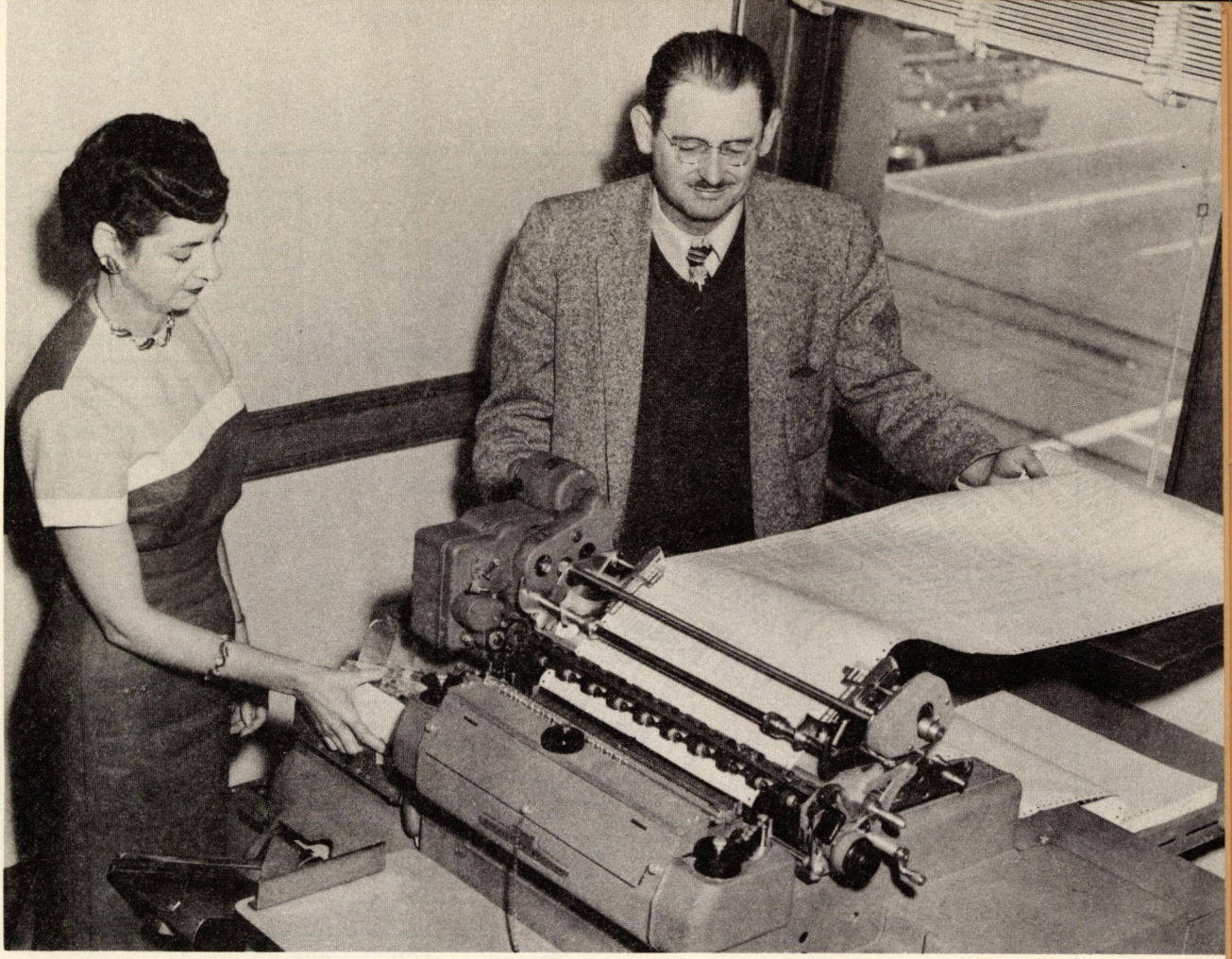


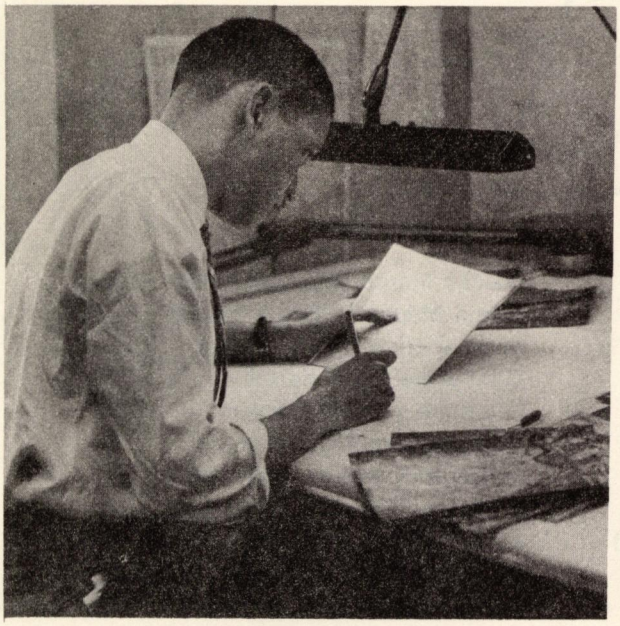
Other facilities for watershed studies are set up in different forest types. At Big Creek in the Sierra Nevada foothills, at Teakettle Experimental Forest in the southern Sierra high country, and at Sagehen Creek in eastside forests of the Truckee River drainage.

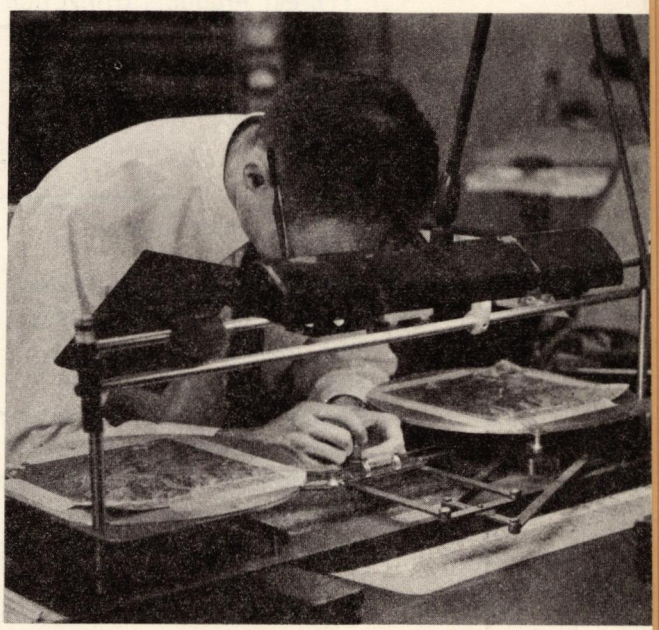




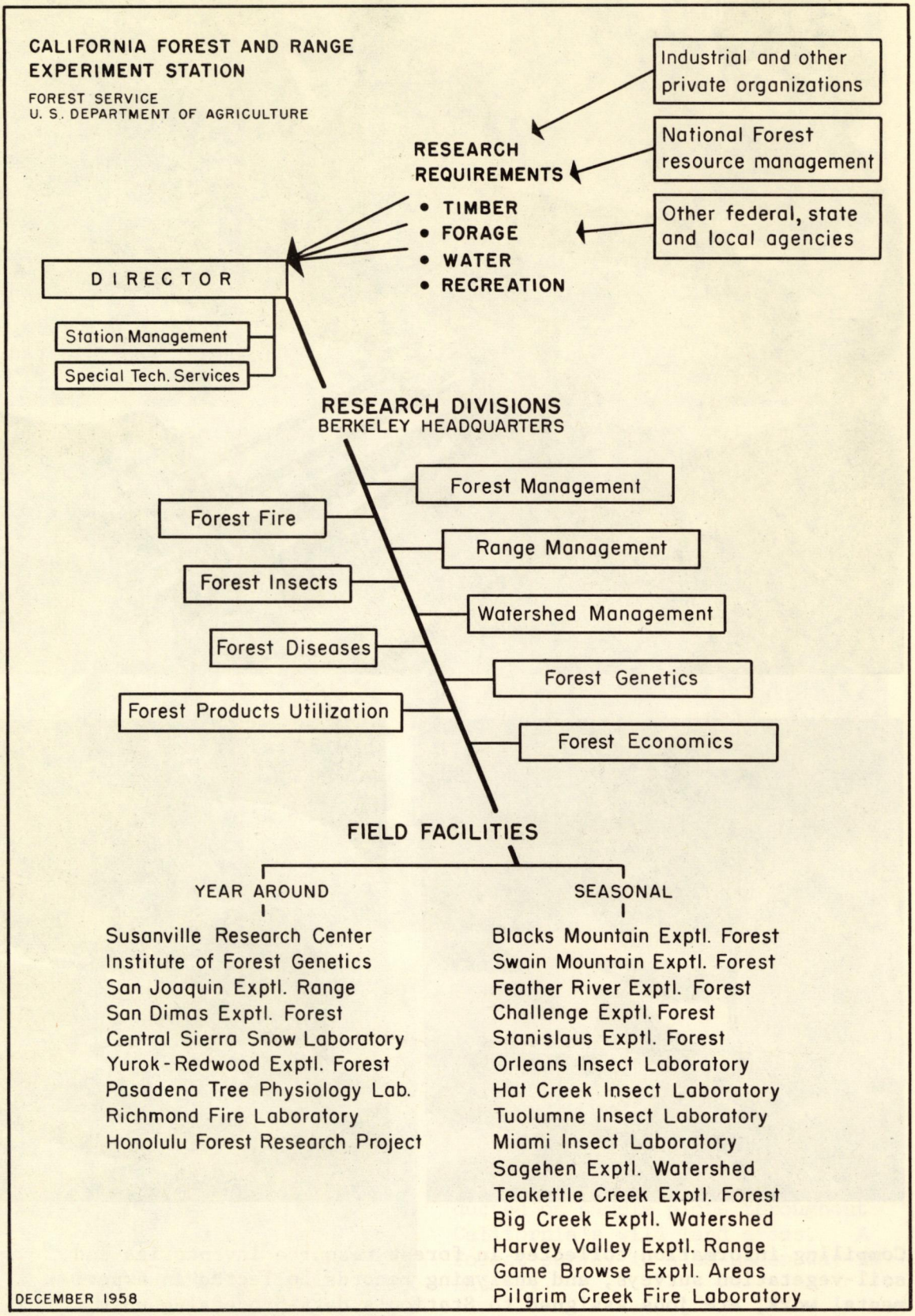
The Forest Survey and the Cooperative Soil Vegetation Survey provide basic information on the amount and condition of wild land resources. Measurements of timber stands and studies of soil conditions are conducted on sample plots throughout California's wild land areas. A forest survey is also under way in Hawaii.







Compiling information collected in forest resource inventories and soil-vegetation surveys, and analyzing records collected in experimental work, are jobs assigned to Station's data-processing unit. Punched-card machines and electronic computers speed these tasks. Drafting and aerial-photo interpretation sections maintain accuracy and increase efficiency of surveys and resource inventories.


CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE
Industrial and other private organizations
National Forest resource management
Other federal, state and local agencies
RESEARCH REQUIREMENTS
• TIMBER
• FORAGE
• WATER
• RECREATION
DIRECTOR
Station Management
Special Tech. Services
RESEARCH DIVISIONS
BERKELEY HEADQUARTERS
Forest Management
Forest Fire
Range Management
Forest Insects
Watershed Management
Forest Diseases
Forest Genetics
Forest Products Utilization
Forest Economics
FIELD FACILITIES
YEAR AROUND
Susanville Research Center
Institute of Forest Genetics
San Joaquin Exptl. Range
San Dimas Exptl. Forest
Central Sierra Snow Laboratory
Yurok-Redwood Exptl. Forest
Pasadena Tree Physiology Lab.
Richmond Fire Laboratory
Honolulu Forest Research Project
SEASONAL
Blacks Mountain Exptl. Forest
Swain Mountain Exptl. Forest
Feather River Exptl. Forest
Challenge Exptl. Forest
Stanislaus Exptl. Forest
Orleans Insect Laboratory
Hat Creek Insect Laboratory
Tuolumne Insect Laboratory
Miami Insect Laboratory
Sagehen Exptl. Watershed
Teakettle Creek Exptl. Forest
Big Creek Exptl. Watershed
Harvey Valley Exptl. Range
Game Browse Exptl. Areas
Pilgrim Creek Fire Laboratory
DECEMBER 1958

GPO 977434